THE GARDENERS'

MAGAZINE OF BOTANY,

HORTICULTURE, FLORICULTURE,

And Natural Science.

CONDUCTED BY

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AND IN JUDGING FLORISTS' FLOWERS, BY MR. GEORGE GLENNY, F.H.S.

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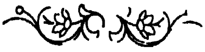

PREFACE.

AGREEABLY to periodical custom, we have again the pleasure, on the completion of another volume, of thanking our friends and correspondents for the continued confidence they have manifested in "THE GARDENERS' MAGAZINE OF BOTANY," and for the liberal support which they have accorded to it. For this we return them our warmest and most grateful thanks; and, at the same time, venture to hope that the evidence we have manifested of a desire to be useful in promoting the cause of Botanical and Horticultural Science, will secure for us, in the great year of 1851, a still larger amount of support.

In the present volume a part of the Coloured Illustrations have been devoted to New Fruits, a feature which, we doubt not, will be favourably regarded by our subscribers, and which will be continued in succeeding volumes whenever subjects of sufficient interest present themselves; and thus we hope to win for the Magazine a Pomological as well as a Botanical reputation, and render it—what a gardener's magazine ought to be—a complete record of every new fact which may present itself in the circle of the sciences with which it is connected.

From our friends in all parts, abroad as well as at home, we solicit the passing tribute of a kindly word, and, in all confidence and humility, would again remind them that, while determined to spare neither trouble nor expense to render the Magazine as perfect as possible, the realization of our anticipations can only be effected by the hearty co-operation of all concerned; and therefore, we hope and solicit that every new fact which may come under their observation may be transmitted to us for publication. Thus, and thus only, is it possible for us to attain that full measure of usefulness which we are desirous should characterize this periodical.

Again, in an especial manner, thanking all who have assisted us by their pen, pencil, or advice, or by supplying subjects for illustration, we wish them success in their peculiar avocations and a very happy new year.

LONDON, *December* 31, 1850.

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EXHIBITION OF AMERICAN PLANTS IN THE GARDEN OF THE ROYAL BOTANIC SOCIETY.

THE GARDENER'S MAGAZINE OF BOTANY.

OF the many sights about Town which have been claiming the attention of the public, that of the American plants in the Garden of the Royal Botanic Society was not the least attractive. With the following summary of what was there to be seen, we have also much pleasure in presenting our readers with a sketch, showing to some extent the arrangement and grouping of the plants. A more gorgeous floral feast it would be almost impossible to conceive in a space so limited, unless with Dr. Wallich we picture to ourselves the Rhododendrons of the Himalayas, the effect of which he compares, when viewed at a distance, to that of regiments of soldiers, in scarlet uniforms, in the full sun. There, however, the Rhododendrons are nearly all scarlet; here, unfortunately, the paler colours, as purples, lilacs, and lighter hues prevail, and hence the effect is quiet and very much less glittering. Thanks, however, to the industry of the Bagshot nurserymen, and some few private individuals, the race of hardy Rhododendrons is fast improving, and varieties nearly as bright in colour as their parents of the eastern hemisphere are fast coming into cultivation; so that, in a few years, those who go with the times, and add the novelties as they appear to their collections, will entirely change the character and appearance of their American gardens, while for single specimens upon lawns these high-coloured varieties will be invaluable. It is not only in colour that Rhododendrons are improving; in form and substance also they are making way. They are losing the flimsy frilly character, and gaining in size of truss and of individual flower, also thickness and rotundity, and the cup-like form, which alone can make them what florists desire they should be. One which we have seen this season, and which we hope shortly to figure, called Towardii, raised by Messrs. Standish and Noble, is nearly perfect in that respect, and Rembrandt, Murillo, and Guido, in the collection of

Mr. H. Waterer, are remarkably fine things, which must [illegible] all who admire first-class flowers. "But," remarks some anti-florist, "Everestianum, what magnificent thing, how beautifully fringed, and what a lovely colour." Granted: it is a lovely thing as seen in the collection of Mr. John Waterer, and we must confess that, much as we desire to see fine formed flowers, we are not sufficiently prejudiced and artificial in our taste to wish to see the form of this fine flower altered. It is distinct and beautiful, and as such let it remain; shining by contrast with more modern productions, and breaking that sameness of outline which alone can satisfy the longings of our thorough-going florists.

The exhibition of American plants is held, as we have before stated, in the Garden of the Royal Botanic Society in the Regent's Park, under a tent covering a considerable space of ground, which has been arranged, with an eye both to taste and utility, by the worthy curator of the garden, Mr. Marnock. Entering by the central and principal entrance, the ground slopes considerably, and advantage has been taken of this to raise mounds on each side, extending almost to the bottom of the tent, and divided into clumps edged with grass verges, in which the shrubs are planted. The open space between these principal clumps has a number of raised circular beds of various sizes, in the centre of which fine single specimens of tree Rhododendrons are placed, the remaining space being covered with dwarf and very choice varieties. In our engraving, which must only be considered a "bird's eye view," the tent and its appurtenances of supports, &c., is left out, our object being to picture a pretty garden scene, which all who have the means may *create* for themselves; and that at no very formidable outlay, in any place between the Land's End and John O'Groats, or the Giant's Causeway and Cape Clear.

Among the most absurd of vulgar errors is that of supposing that American plants will not grow almost in any situation, from the deep ravine to the mountain top, from the floating island, formed on some rude *raft*, to the driest peak which this or any other temperate country supplies. All that is necessary is cultivation, and, as a matter of course, preparation; and every estate, every locality in the wide range before alluded to, will supply material as good as can be desired, if properly prepared and intermixed. In the place, in one of the midland counties, where the writer of this first saw the light, and where an estate of many thousands of acres does not yield a handful of peat earth, which many consider the only suitable soil for American plants, are some of the finest specimens of Rhododendrons in the world, growing in a sandy marly yellow loam, of some two feet in depth; some of the plants twenty years back being thirty feet in diameter, and proportionately high, and what they are at the present time, we hope shortly to have the means of showing. All that is required to grow American plants to perfection is, a soil deep and porous, and rich in vegetable matter, and whoever can command top-spit loam, with leaf mould or other decomposed vegetable matter, and some good gritty sand, may grow American plants as well as they grow at Bagshot, or in any other peaty locality. On this subject we shall have more to say when noticing "Waterer's system of growing Rhododendrons, &c.," by Mr. W. B. M'Pherson, an *attaché* of Mr. H. Waterer's establishment, and Messrs. Standish and Noble's Catalogue, which contains an excellent treatise on the culture of American plants.

To return to the exhibition:—On entering, the ground to the right and left is occupied by plants from Messrs. Standish and Noble, of Bagshot; the bottom of the tent with a part of the side slips by Mr. H. Waterer of Knap-hill; the right side by Mr. John Waterer of Bagshot, and the left by Mr. G. Baker's plants from the Windlesham Nursery, Bagshot.

In these collections the most remarkable kinds, at the time of our visit, were the following:—

Messrs. Standish & Noble.

Rhododendron, Miss Agnes Loudon, rose, tipped with salmon, tolerable form.

R. Mrs. Loudon, pinkish salmon, nicely spotted, deficient in form, but conspicuous.

R. Maid of Athens, delicate pink, nice form.

R. Pulchellum, dark purple, tipped.

R. Pictum, white, with a dark spot, pretty.

R. Roseum compactum, a compact rose-coloured flower, of tolerable form.

R. Erectum, deep rose, good.

R. Candidum, fine white, faintly tipped with lilac.

R. Elegans, rose colour, distinct, and very dwarf.

R. Sabrina, pale pink, delicately marked on the throat.

Mr. John Waterer.

R. Lyonense, pink, very pretty.

R. Princeps, pinkish lilac.

R. Everestianum, delicate pink, or French white; the flowers fringed, and very abundant.

R. Maculosum, white, tipped with pale lilac, greenish blotch.

R. Nivaticum, the best of the whites as to colour, but deficient in form, free.

R. Gloriosum, pale lilac, very large.

R. Delicatissimum, white, tipped with lilac, first-rate.

R. Vestitum coccineum, rosy scarlet, nicely marked.

R. Hyacinthiflorum, rosy lilac, or purple, double, and very distinct.

R. Macranthum, bright rose, shaded to the edge.

R. Roseum elegans, very profuse.

R. Leopardii, very distinct and late, large and good, purple, with brown spots.

R. Blatteum, very large, the flowers being four inches across, distinct.

R. Blandyanum, deep rose, nearly scarlet, tolerable form.

R. Album elegans, white, with green spots, good form.

R. Catawbiense flore pleno, a double light purple variety.

Mr. H. Waterer.

R. Augustus, purple, distinctly marked with green, fine form, and truss.

R. Fastuosum flore pleno, pale lilac.

R. Constantine, purple, distinctly marked.

R. Guido, transparent rose, fine form.

R. Murillo, very dark purple, fine form.

R. Atrosanguineum, crimson, fine form, late, and very good.

R. Rembrandt, deep transparent rose, shaded to the edge, very superior.

R. Cœlestinum, a bluish lilac self-coloured variety, of good form.

R. Poussin, dark reddish purple.

R. Vandyke, a lively self-coloured rose.

R. Jackmanii, rosy puce, very dark spots.

R. Purpureum grandiflorum, very distinct.

Mr. Baker.

R. Delicatum, fine white, with deep spots, very free.

R. Grandiflorum maculatum, rose pink, fine spots, large.

R. Mammoth, rosy lilac, good form.

R. Ignescens, deep rose pink, nearly scarlet.—A.

PROFESSIONAL AND MORAL TRAINING.

HINTS ADDRESSED TO YOUNG GARDENERS.

By Mr. W. P. KEANE, Author of "The Beauties of Surrey," &c.

I AM glad to find that you had the good sense to procure another place of employment before you left the gardens at C——, where you had remained sufficiently long to have acquired a general knowledge of the gardening operations so successfully practised in that establishment. It is not the length of time that a young gardener may spend in a place so much as a careful attention to note in the mind, and also in the memorandum-book, the daily occurrences that come under his notice, that best prepare him for a change. I have seen some young men spend several years in a garden without much profit from their experience, and others, who have not remained half the time, leave with a large share of useful knowledge. The abilities of all seemed to be generally equal, but their tastes and inclinations were various. To some the daily work was a toil, and life a misery—counting the minutes as hours till the clock struck the time for breakfast, for dinner, or for resting from the labours of the day. To others the hours passed briskly and pleasantly along, to whom the various work that every day produced was a pleasure, affording them some hints for improvement, or new ideas for further investigations. The evening hours showed the bent of each man's inclinations. Your own short experience, I make no doubt, has been sufficient to prove to you, that those who retired, after the evening repast was over, to ruminate over, or to note in the memorandum-book the work of the day, or to pore over some book for further information, are the persons who have most generally raised themselves by their persevering industry, and good moral conduct, to the highest stations of their profession. After some years, I have seen those who preferred the amusements of gay frivolity to the more useful desire of self-instruction bitterly complain that gardening was a bad business, and that success invariably depended upon friends and patronage. It is true that by the kindness of friends or patrons good situations have been, and are now, procured for many gardeners; but in very many instances the friendship or patronage is extended to the individual for the purpose of giving him a fair chance of advancement in life; and misconduct, or mismanagement, will afterwards forfeit all claims to further notice. I believe, as the poet wrote, that

> "There is a tide in the affairs of men,
> Which, taken at the flow, leads on to fortune;"

and that a young man, of good moral conduct, with an unflagging desire to take a fair advantage of every opportunity that circumstances may place in his way, will ultimately succeed in procuring that advancement to which, by his qualifications, he is justly entitled.

I see no fear for despondency; be assured that the principal part depends upon your own exertions, and as a faithful guide, I shall undertake the pleasing duty of pointing out, as to me seems best, the road for you to follow to gain that information so necessary for your future advancement. Your handwriting is pretty good; but a correct knowledge of English grammar is indispensably necessary, as without it, a continual diffidence will attend all your efforts to give expression to your thoughts, either in speaking or on paper. This knowledge is particularly useful to gardeners, who are in many places required to communicate frequently with their employers, on many subjects concerning the management and other affairs of the gardens. Be assured that correct grammar embellishes all communication; and that ideas, good in themselves, when clothed in bad grammar lose half the impression that would otherwise be made by them. An acquaintance with grammar gives that degree of confidence which is necessary to lead you on to further improvement. I am the more anxious to impress upon your mind the great advantage of acquiring this knowledge, as young gardeners are often very deficient in this respect. Whether it is that they do not see the benefit of it, or whether they are too indolent to exert their mental faculties for its acquirement I know not, but this I know, that very few possess any acquaintance with the grammatical construction of the language. It is to be deplored that such is the case, more particularly when a very short but close attention will give a general acquaintance with the subject which will extend to the more minute particulars of that branch of learning, as reading and other studies progress.

Of all occupations to which a man is born, who has to depend upon the labour of his hands and head for an existence, that of a gardener appears to me the best. The variety of employment to which the routine of business calls him is, to a young man imbued with a taste for the study, both pleasing and healthful. The work is not always laborious, and the various employments give a pleasing relief conducive to health. Exercise is necessary to procure a sound state of the body and of the mind. A well spent day in the improvement of the garden will give a relish to the studies of the evening.

It is the great complaint amongst young men that Nature has not supplied them with good memories, as they soon forget what they have read. In most instances I have observed it was not their memory that was to blame, so much as their own want of fixing the attention on what they read. They allow the eyes to roll over the book, heedless of forming a communication with the brain, and, when the book is closed, there is left only a vague dreamy recollection of having read something, the particulars of which had vanished into "thin air." To read profitably it is necessary to fix the attention, to divest yourself of all thoughts foreign to the subject on which you are engaged, and at the end of each page or chapter to take a review of it mentally, that is, to close the book and to repeat, as well as your recollection serves, the words that you have read; when you find yourself deficient in the main particulars, read it again and again until you make yourself master of it. When you are about to finish the reading for the evening, take a retrospective view of the whole in your mind's eye, and you may be sure by a regular perseverance in that system, you will have no reason to complain of your memory. It is more profitable to read one page in that manner, than to run over the pages of a whole volume without leaving any lasting or useful impression on the mind. Read slowly but surely; my advice is given from experience.

HORTICULTURAL SOCIETY.

June 18.—Few subjects of exhibition were present. Mr. Loddiges, of Hackney, sent a Bombay orchid like Saccolabium Blumei; and Mr. Cuthill, of Camberwell, had well-ripened examples of the Black Prince Strawberry, a very acid but early variety. From the garden of the Society was Boronia spathulata, a rather nice species; Achimenes Escheriana, Kleei, and the small bright scarlet pyropæa, together with Phyteuma violæfolia—a nice plant for rockwork; and the Californian Abronias—umbellata and pulchella.

July 2.—No meeting was held; but as there were some few interesting subjects sent for exhibition, we shall briefly notice them. The most remarkable of these was an Achimenes, named Tugwelliana, sent by Mr. Glendinning, of Chiswick: it is of compact habit, with moderate-sized, shining, ovate leaves, and spurless flowers of a very deep rich colour, which we may call a true purple, as it had a very decided tint both of blue and rose—the blue tint more conspicuous in the younger, the rosy tint in the older blooms: it is a distinct and pretty variety. The other plants were from the Society's garden. Among them was a hybrid Cereus, raised by Mr. Gordon from C. crenatus crossed with speciosissimus: it has the broad, flat, crenated stems of the former, and flowers of the same form,—the sepaline divisions of the perianth being long and narrow, the coralline segments shorter and broader—but the colour is a deep rose pink; it makes a pretty variety. There was also a Gesnera, named primulina, a plant with upright stems, two feet and a half high, branching oppositely, having hairy elliptic stalked leaves, about three inches long, and furnished in the upper axils with a few light scarlet flowers, having a tube an inch and a half long, ventricose above, and a very unequal limb, the upper lip being considerably prolonged, the lower lip short and three lobed. Besides these there was Achimenes Kleei, a pale rose form of the longiflora section, not of much worth as now seen; Metrosideros robusta, a neat shrub, with myrtle-like leaves, and terminal branches of crimson threads; Spathoglottis Fortuni, a pretty greenhouse, herbaceous plant, with long, narrow plaited leaves, and spikes of yellow blossoms; a small Rhyncospermum jasminoides, very full of flowers; the comparatively worthless Adamia versicolor; Abronia umbellata, and some others. Cut Pinks were sent by Messrs. Turner & Edwards.

Mr. Wilmot, of Isleworth, sent a seedling Strawberry, named Prince Arthur, of the merits of which we had no means of judging beyond that presented by its appearance: the fruit is deep red, averaging an inch and a half in diameter, variable in form from obtusely conical to angular, and cockscomb shaped, and somewhat coarse looking.

AMARYLLIS ACRAMANII PULCHERRIMA.

Nat. Order, AMARYLLIDACEÆ.

GENERIC CHARACTER.—Amaryllis, *Linn.*—*Perianth* corolline, superior; *tube* short, or wanting; *limb* six-parted, sub-ringent, with nearly equal recurved lobes, the throat often with scales. *Stamens* six, inserted in the throat of the perianth; *filaments* free, declinate or erect, nearly equal, or alternately long and short; *anthers* versatile. *Ovary* inferior, three-celled; *ovules* numerous, inserted in two rows in the central angles of the cells, nearly horizontal, anatropous; *style* filiform, elongated, taking the direction of the stamens; *stigma* gaping, or three-toothed, the teeth recurved. *Capsule* membranous, oblong-three-sided, or depressed-spherical, three-celled, loculicidally three-valved. *Seeds* numerous, globose, or paleaceous-compressed, margined or winged, sometimes fleshy, by suppression solitary, filling the whole cell, or the entire capsule.

SUB-GENUS.—Hippeastrum, *Herbert.*—*Perianth* almost funnel-shaped, the throat of the tube contracted, smooth within, gibbous or fringed, lobes of the limb unequal. *Stamens* inserted in the throat, declinate, curved upwards toward the end, unequal. *Style* in the direction of the stamens; *stigma* three-lobed, or three-toothed. *Capsule* with three furrows. *Seeds* in one series in the cells, imbricated; the testa black, often margined.

AMARYLLIS AULICA, *Ker.*—Scape two-flowered; flowers ringent; leaves shining; crown of the tube firm, coloured, obsoletely toothed; lacinia involute below at the bottom of the limb; stamens included.—(*Bot. Register*, vi. 444.)

Varies with broader and more equal and obtuse segments of the perianth—(*A. platypetala*, *Bot. Reg.*, xii., 1038.)

HYBRID. AMARYLLIS ACRAMANII PULCHERRIMA.—A cross between *A. aulica* and *A. Johnsoni*, having a broad, scarlet-crimson perianth, veined and reticulated with a deeper shade, and with a broad green stripe at the base of each segment.

DESCRIPTION.—Leaves bright green, broad, tapering to an obtuse summit. Scape two or more-flowered, glaucous. Flowers large and spreading; segments of the perianth broad, ovate, acuminate, somewhat undulate, green at the base, with a stripe of green extending some distance up the middle of the disk of each lobe, the rest of the limb deep scarlet-crimson, (blood-colour,) deeper in the middle, and with indistinct deeper veins and blotches forming a kind of reticulation. The stamens declinate, green below, red above, the pollen yellow. The style which takes the direction of the stamens is likewise green below and red above, with the inner surfaces of the three-parted stigma white.

HISTORY.—This plant, which was shown at the Horticultural Society's Exhibition in May 1850, under the above name, is stated to be a hybrid between *A. aulica* and *A. Johnsoni*, the latter of which is regarded as a hybrid form. It appears to take its colour from the former, and the stripings from the latter, and is a remarkably rich-looking flower, from its full colour and the breadth of the segments of the perianth. The present name is hardly a convenient one, since the name of *A. Acramanii* was previously given to a hybrid between *A. aulica platypetala* and *A. psittacina*, by the raisers of both plants, Messrs. James Garraway and Co., of Bristol; the present having been called *A. Acramanii pulcherrima* merely on account of the resemblance in form, and size of the flowers, to the original *A. Acramanii*.

Our figure of this fine bulb was taken from the plant already alluded to as having been exhibited by the raisers, Messrs. Garraway, Mayes, & Co., nurserymen, of Bristol.—A. H.

THE CULTIVATION OF THE GENUS AMARYLLIS.

BY MR. M. SAUL, GARDENER TO THE RIGHT HON. LORD STOURTON, ALLERTON PARK, YORKSHIRE.

THIS splendid and beautiful family of bulbous plants appears to me not to be so extensively cultivated as it deserves, containing, as it does, so many varieties of surpassing loveliness, beauty, and grandeur. This, of itself, is sufficient to secure for it a large share of attention. But it has a still stronger recommendation for extensive culture; namely, that it can be made to produce its gorgeous and magnificent flowers equally as fine during the autumn and winter months as at any other season; on which account it is invaluable to all who have conservatories and drawing-rooms to keep gay during these months; for though modern gardening furnishes a long list of plants well adapted for this purpose, still the many truly elegant and superb varieties we now possess, the length of time they continue in flower, and the very pleasing variety they make, very justly give them a claim to a high place among decorative plants.

The few remarks which I offer on their cultivation will be a mere outline of the mode I adopt. I find all the varieties of the Amaryllis delight in good light turfy loam with a little rotten dung, or some partially decomposed leaves and a little sand. All the larger kinds, when placed in good large sized pots—all other conditions being favourable—throw up magnificent flower stems. I have had a bulb of A. Johnsoni, that threw up at one time four strong flower stems, each of which had four flowers. A more splendid object than this it is scarcely possible to conceive.

The number and size of the flowers will depend on the amount of organized matter stored up in the bulb, which is a magazine that contains all the nutritive matter collected from the leaves.

Bulbs increase in size and store up matter only during the period in which they have leaves; the quantity and quality of it will, therefore, depend on the health, vigour, size, and number of these, and the length of time they continue to operate, which they do most efficiently when young and under the influence of bright sunlight. Every attention should, therefore, be paid to keep the leaves in a healthy, active state as long as possible.

When flowers are required during the winter, the bulbs should be introduced into the hothouse early in the autumn. As Amaryllises generally flower early in the season, there will sometimes be a little difficulty at first to keep them back till winter. The way I manage is this. Supposing a bulb to flower this year in May, no attempt having previously been made to retard it; I next season retard its flowering till autumn, and the season following till winter. By this plan, and having a good stock of bulbs, there is not the slightest difficulty in having them in flower all the winter through. If the soil be very dry when the bulbs are first brought into heat, an excellent plan to adopt is, to place the pots in a tub of water for half an hour, after this they will not require much water for some time. The flower stems and leaves will soon show themselves, and as they increase water must be given more freely. If the bulbs contain plenty of organized matter, they will only require a little heat and water, with exposure to light to produce their flowers. As soon as these are fully expanded, the plants should be removed to the conservatory or drawing-room, which they will adorn for a month or six weeks. After they have done flowering they should be potted, no matter what season of the year; the leaves are then in healthy action, and when placed in large-sized well drained pots, in the soil recommended, carefully watered, and placed in a good heat fully exposed to the light, they will grow most luxuriantly, and the bulbs will increase in a proportionate degree: they will become magazines replete with organized nutritive matter, and will produce the following season magnificent flowers. When the leaves naturally show symptoms of ripeness or decay, water must be gradually withheld; and when fairly decayed, the pots should be placed in a dry, airy situation, where neither frost nor rain can reach them; here they may remain till the time for starting them again comes round. It may be objected that plants flowering during the winter will not, under any treatment, store up as much highly organized matter as plants flowering during May or June. Plants flowering at the latter time will have all the advantage of bright sunlight for storing up nutritive matter, which will be, without doubt, more *highly* organized than that stored up by plants flowering during winter. But the leaves continue to operate for a much longer time on plants flowering in winter than on those flowering in summer; by this means as great an amount of nutritive matter is stored up by the former as by the latter, though, perhaps, not quite so *highly* organized. But the advantage of having these magnificent flowers in winter is more than an equivalent for any loss.

The following list includes some of the finest varieties in cultivation:—

A. aulica platypetala.
A. Acramanii.
A. Acramanii pulcherrima (splendid).
A. delicata.
A. intermedia latipetala.
A. Jordoni.
A. Johnsoni.
A. insignis.
A. intermixta.
A. intermixta augusta.
A. lineata.
A. marginata conspicua.
A. marginata venusta.
A. magnifica perfecta.
A. picta.
A. reticulata.
A. refulgens.
A. sanguinea.
A. venosa grandiflora.
A. vittata pallida.

I may perhaps mention two firms that are very rich in Amaryllises—the Messrs. Knight and Perry, of Chelsea, and the Messrs. Garraway, Mayes, and Co., of the Bristol Nursery; the latter gentlemen possess the most extensive and valuable collection in Britain; and Mr. Mayes having devoted much time and attention to this lovely genus, has been the successful raiser of very many of the finest varieties in cultivation.

Reviews, and Miscellaneous Notices.

The Rudiments of Botany: a Familiar Introduction to the Study of Plants. By Arthur Henfrey, F.L.S., &c., &c. London: Van Voorst. Pp. 250.

A small manual of pocket size, intended for persons commencing the study of Botany. It is the best "First Book of Botany" we have seen, both in its plan and execution; the learner being led on, step by step, in a direction, which, to our minds, seems clear and easy of access, and is instructed in the rudiments of the science in elegant, yet simple and popular language, admirably aided by a number of small but expressive wood-cut illustrations. We have selected, as a specimen extract, a passage in which the bearing of the facts of the science upon the practical duties of gardening is shown in a very interesting way. After explaining the nature and characters of *buds*, Mr. Henfrey goes on to remark:—

> "That the buds are to a great extent independent of one another is shown in the common operations in gardening, where plants are multiplied by separating the stem into pieces, each

bearing a bud, which are capable of producing adventitious roots for their own support, and thus becoming independent plants. This is seen in slipping and laying, the latter process being an artificial mode of effecting what is done naturally in the production of stools and runners. New plants produced from buds, in any manner whatever, can have no *true* roots—all their roots must be of the adventitious kind; and if examined, it will readily seem that they are never, even apparently, prolongations of the lower end of the stem. In the operations of grafting and budding, an instance is afforded of the power of distinct plants to become actually united by growth; but this can naturally only take place when the graft and stock have their structures of almost identical nature, so that their modes of growth and enlargement do not differ to any considerable degree; then the bud, instead of producing adventitious roots, draws its nourishment from the stem of the plant to which it has grown, and of which it becomes as completely part as a bud naturally produced upon it, only showing its independence by retaining in its own branches the character of the plant from which it had been originally removed."

The book, which is very nicely got up, contains, besides general introductory remarks, chapters on the organs of simple growth and nutrition; on the organs for the production of new plants; on flowerless plants; and a sketch of Systematic Botany.—M.

An Analysis of the British Ferns, and their Allies. By G. W. Francis, F.L.S. &c., &c. London: Simpkin and Marshall. 8vo, pp. 88.

Of this useful little work on the Ferns, Lycopods, and Equisetums indigenous to Great Britain, a fourth edition is now issued, which, as far as we can discover, does not in any respect differ from that which preceded it. The author, who originally adopted, and still retains the old nomenclature, besides a general sketch of the structure, distribution, and uses of the different groups treated of, has given under each species a brief specific character, and description, with a reference to synonymes, figures, and habitats; but as a book of reference for the study of our native Ferns—a study every day becoming more widely spread—it is imperfect in not containing any allusion to the new Ferns which have been recognised, and described within the last five or six years, or since the date of the second edition of this "Analysis." The illustrations consist of nine plates, each containing from five to eight figures; and these though necessarily small, are neat and clear, and mostly characteristic. The figure given of Polypodium calcareum, is, however, an error; and we differ with Mr. Francis as to the name of the plant which he calls Aspidium aculeatum. There are some other discrepancies of nomenclature, but as the author avowedly follows the older names, we leave them without further criticism. To have maintained its former useful character, this edition should have undergone revision, so as to have at least disposed of the recent additions to British Pteridology.—M.

Oxford Botanic Garden; or a Popular Guide to the Botanic Garden of Oxford. By C. Daubeny, M.D., F.R.S., &c. Oxford: Shrimpton, pp. 56.

One of those useful sixpenny guide Books, which are provided at most of the public botanic gardens for the use of visitors. That under notice, contains a plan of the Oxford Garden, as at present arranged; with an historical sketch of the origin and progress of the garden, in which are introduced some views and a plan of the garden as it was towards the close of the seventeenth century. The rest of the book is taken up by a discursive tour through the various departments, the more important plants cultivated in each being mentioned, in many cases with interesting anecdotes or other information concerning them. In the Experimental Garden—

> "A series of experiments has been carried on for ten years, on no less than sixteen different kinds of vegetables, with the view of ascertaining what influence on the amount of produce, and upon the quality of its mineral ingredients, might be exerted by continuing a crop for a number of successive years on the same plot of ground, by comparison with the same crop shifted from one plot to another during the same period, no manure being applied to either.
>
> "The results arrived at appeared decisive in favour of the advantage of a rotation; but the most interesting conclusion I was led to deduce," writes Dr. Daubeny, "related to the distinction existing between the *active* and *dormant* ingredients of a soil, as it appeared that a portion only of the mineral matter which it contains is in a condition to be taken up by a plant, the rest being connected to the other ingredients by too close an affinity, to be separable from them at the time by the action of atmospheric agents. It is to this power of promoting the gradual operation of the latter, in unloosing the dormant ingredients from their union one with the other, and in thus rendering them available, that the utility of ploughing, and of other agricultural operations seems mainly attributable."

These "Guide Books" are all extremely useful to those who have occasion to employ them.—M.

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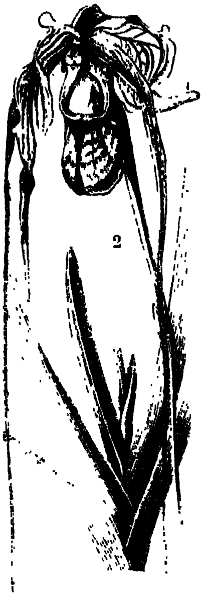
New Fancy Pelargoniums.—The fancy Geranium show at the Surrey Zoological Gardens presented three very marked improvements—Formosissimum, Beauty of St. John's Wood, and Ada, all three good general forms. Formosissimum, a beautiful edge, flowers well laid to form good trusses, and a pretty distinct rosy-coloured marking. Beauty of St. John's Wood, a most brilliant rose, bright, indeed, as crimson-scarlet, but with a purplish tinge; but it had not lost its fringed or puckered edge. Ada had many false pips, but there was one which indicated a beautiful form, if the rest had been like it in character. Formosissimum and Beauty were first rate; for we care not, as yet, about the puckered edge, when it is the only bad point about a flower, and when all the other essentials are in perfection. There is a wide distinction between condemnatory or disqualifying blemishes, and faults of degree. An ill-formed Dahlia places the flower below a well-formed one, but an eye exposed makes it no flower, and casts it altogether. A long-cupped Tulip is placed below a short-cupped one of the same quality in other respects, but a foul bottom condemns outright the best-formed flower in the world. Now the edge of a fancy flower may, according to the roughness or smoothness be a point against it, and drive it lower in competition with others in all respects equal with a better edge, but it is no condemnation, and it is possible to gain as much by its other properties as it loses by the edge. The Beauty of St. John's Wood beats even Formosissimum in colour, but the edge of the latter, is better. In short, they are the two best that have been exhibited, and if we may take the solitary pip of Ada as a criterion of what it may be, and shut out from our view all the false flowers, that will also be an acquisition.—*Country Gentleman.*



NEW AND RARE PLANTS.

LAPAGERIA ROSEA, *Ruiz and Pavon.* Rose-coloured Lapageria. (*Bot. Mag.*, 4447).—Nat. Ord., Philesiaceæ.—A beautiful climbing plant, probably requiring the protection of a greenhouse. The stems are round, branching, and grow to a considerable length, bearing ovate-lanceolate, coriaceous, glossy, stalked leaves, and from their axils, the solitary lily-like blossoms; these are large and very handsome, and consist of six parts, the three outer narrower, all deep rose colour internally spotted with white; they are succeeded by large oblong pulpy berries, of sweet and agreeable flavour.—From Chili; introduced in 1847. Flowers ——?

CYPRIPEDIUM CAUDATUM, *Lindley.* Long-tailed Lady's Slipper. (*Pract. Fl. Gard.*, i. t. 9).—Nat. Ord., Orchidaceæ, § Cypripedeæ.—A very remarkable, stemless, cool stove, herbaceous plant, with distichous, sword-shaped, leathery leaves, a foot long, and an erect scape longer than the leaves, bearing several flowers from within large spathe-like bracts. The sepals are curved, ovate-lanceolate, the petals are extended into long, narrow, linear tails, the lip is oblong, pouch-shaped, glandular on the edge near the base; the sepals are dirty yellowish green, the petals dull brownish purple, the lip dirty flesh colour with dull purple veins. The petals are short at first, and in three or four days grow to a foot and a half in length.—From Peru; mountains; introduced in 1848. Flowers in spring.

MITRARIA COCCINEA, *Cavanilles.* Scarlet Mitraria. (*Bot. Mag.*, t. 4462).—Nat. Ord., Gesneraceæ, § Gesnereæ.—A handsome low shrub, with slender, obscurely tetragonous branches, and small opposite, rarely ternate, leaves, of an acuto-ovate form, crenato-serrate, and of a delicate green colour. The flowers are axillary, and grow on long drooping pedicels; they are tubular, the tube constricted at the base, curved, and ventricose above, a little contracted at the mouth, and dividing into an obscurely two-lipped limb of five obtuse spreading segments; the colour is a bright light scarlet.—From Chiloe; introduced in 1848. Flowers in summer.

LARDIZABALA BITERNATA, *Ruiz and Pavon.* Biternate-leaved Lardizabala. (*Bot. Mag.*, t. 4501).—Nat. Ord., Lardizabalaceæ.—A desirable, hardy, evergreen climber, suitable for covering high walls. It is a rapid grower, with terete, often twisted branches, bearing variable leaves, which are sometimes bi-, or even tri-ternate, but generally simply ternate; the leaflets ovate, leathery, dark-green. The peduncles are solitary from the axils of the leaves supporting the pendent spikes of flowers; the sepals six, deep purplish chocolate colour, rhomboo-ovate; the petals six, small, lanceolate, white, forming an eye or disc to the flower.—From Chili: Concepcion; introduced in 1847, by G. T. Davy, Esq. Flowers in winter. "The fruit is sold in the Chilian markets." Messrs. Veitch, of Exeter.

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inea.
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Grammanthes gentianoides

GRAMMANTHES CHLORÆFLORA.

Nat. Order, CRASSULACEÆ.

GENERIC CHARACTER.—Grammanthes, D. C.—*Calyx* campanulate, five-toothed, erect. *Corolla* perigynous, tubular, equalling the tube of the calyx; limb five or six parted, with oval, expanded lobes. *Hypogynous scales* wanting. *Ovaries* five, free, one-celled; *ovules* numerous, on the ventral suture. *Capsules* follicular, five, free, dehiscing longitudinally on the inside, many seeded. -(*Endlicher Gen. Plant.* 4613).

Grammanthes chloræflora, Haw.—Chlora-flowered Grammanthes.—Leaves oblong or elongate, the cordate base, half embracing the stem; lateral pedicels at length reflexed; flowers yellow and orange inside, with the mark of a reversed V. on each lobe.

SYNONYMY.—Crassula retroflexa, *Thunb.*—C. dichotoma, *Linn.*—*Ait. Hort. Kew.* ed. 1. Vaccanthes chloræflora, *Haw.* (? Grammanthes gentianoides, D. C. Crassula gentianoides, Lam., Pluk.)

DESCRIPTION.—A dwarf succulent annual herb, with opposite fleshy leaves, and a trichotomous cymose habit of branching. The stem rather slender, round, smooth, pale-coloured, succulent, and brittle. The leaves opposite, sessile, fleshy, elongate-cordate; the basal lobes adherent to and half embracing the stem, finely papillose, glaucous beneath. Inflorescence in loose cymes. Calyx elongate campanulate, the tube tapering down into the pedicel; limb five-toothed; teeth ovate, overlapping by the edges below; obtuse, fleshy, glaucous, erect. Corolla gamopetalous; the tube narrow below, shorter than the tube of the calyx; the limb five-parted, the lobes ovate-spathulate, imbricated in æstivation; pale beneath, orange or orange-red above at the upper expanded portion; green in the narrow part below, with a deeper red marking in the form of a reversed V at the junction of the claw-like portion with the broader ovate part, this colour shading into the orange above; stamens five, adherent to the tube of the corolla, and alternate with its lobes; no hypogynous scales; carpels five, distinct, forming five pistils.

HISTORY, &c.—A native of the Cape. There do not appear to be any grounds for distinguishing *G. gentianoides* from *G. chloræflora.* Plukenet and Lamarck say that the flower of the latter is blue but the yellow and orange corolla of the present plant acquires a bluish purple colour as it dries We refer it to the original species, as it agrees in all essential points with the characters given for that, and those attributed to G. gentianoides appear to us to be without value.—A. H.

Our drawing of this charming little annual was made in the garden of the Society of Apothecaries at Chelsea. The species was originally introduced in 1774, but was lost, and appears to have been reintroduced a year or two since. The seeds were offered for sale by some of the London seedsmen last season, and had probably been obtained from the continental gardens. It has been recently noticed in *Paxton's Flower Garden* ([illegible]. p. 15), where by some oversight it has been stated to belong to the natural order Gentianaceæ. It is, however, a Crassulaceous plant, much resembling a Sedum. The colour is variable from yellowish to pinkish.

CULTURE.—This is properly a greenhouse annual, and, as a pot plant, makes an admirable companion for the Mesenbryanthemum pyropæum, with which it might also be associated in the open air, on dry sunny rock-work during summer. Like that species, however, the flowers require sunshine to cause them to develop their beauty, but exposed to the sun, a tuft of the plants, when in a flowering condition, forms a mass of yellowish copper-coloured stars of remarkable brilliancy. We can hardly imagine a more beautiful little thing for a sunny window. The seeds should be sown early in March, along with those of other half hardy annuals, in pots, placed either in a greenhouse or in a window, or in a frame with a very mild bottom heat, or in a pit, or, in fact, in any place where they will be subjected to a temperate climate. After germination, and when they have formed a pair or two of small leaves, they should be pricked out in three-inch or five-inch pots, as may be convenient, the plants being placed about an inch apart. They should then be placed in a rather close frame, either with or without very slight warmth—the difference being that in one case they will grow faster than in the other; when they are well established, they may be removed to the greenhouse stages, or planted out as already suggested. If grown in a window, they must be shaded and kept covered by a glass, or some other contrivance until established. A light sandy soil seems to suit them well; we have used a mixture of leaf mould with small proportions of loam and sand, and find them to grow freely; though it is probable that if the young plants had been stopped before they came into flower, they would have had individually a more bushy habit, than those represented in our plate. Sown in March, they come into flower by the end of May; and promise to continue a couple of months in bloom: our plants, though small, are still (July 10) quite fresh, and likely to remain in bloom at least a month longer. Seeds sown about June would probably produce plants to bloom throughout the autumn.

Being small, and bearing a persistent somewhat deceptive leaf-like calyx, it will be necessary, in order to its perpetuation, to examine the plants closely, so as to gather, as they reach maturity, such of the follicular capsules as produce perfect seeds.

The name Grammanthes is derived from the Greek *gramma*, writing, and *anthos*, a flower, in allusion to the letter-V-like spot at the base of the lobes of the corolla, sometimes conspicuous in the blossoms.—M.

ROYAL BOTANIC SOCIETY'S JULY EXHIBITION.

THE last of these annual gatherings in the Garden of the Royal Botanic Society took place on the third of July, and was very numerously and respectably attended. The morning was threatening, and at times the rain fell heavily; the wind also was very rough; but towards noon it abated, the clouds cleared off, and a more enjoyable or delightful afternoon could not have been desired for an out-door *fête*. In July, the Exhibition, with the exception of Roses and Fruit, is always expected to be an inferior one; but on this occasion it formed an exception, and was certainly one of the finest exemplifications of cultural skill which we have seen for a number of years. Of Fruit, nothing like it, either in quantity or quality, has been seen since July 1845, when, at Chiswick, there was a magnificent display; but even that was inferior to the exposition of Wednesday. From the gardens of the Dowager Duchess of Northumberland, at Syon, Mr Ivison again produced a collection of tropical fruits and spices; and Mr. Bray, gardener to E. Lousada, Esq., had a fine collection of the Citrus family, some kinds evincing very superior management. Pines were scarcely up to the mark, though some respectable productions were presented; but even the advocates of the Meudon plan found it more convenient to produce eight pound Providences than Queens twelve pounds each, the standard set up for Queen Pine growing a year or two back by one of our weekly contemporaries. Black grapes were fine, but most of the White ones were very inferior, being very unripe; indeed, the only really ripe Muscats we have seen this season were the Muscats shown by Mr. Spencer, in May, and some people were so ill-natured as to say, which was not the case, that those had been kept over from last year. Some of the Peaches and Nectarines were splendid, both in size and colour; and a vast quantity of monstrous Strawberries, and abundance of good-looking Melons, were also there. We are glad to see this effort of the Fruit-growers to retrieve their lost laurels, and it is only for the Horticultural Society to hold out the same inducements that is held out by the Royal Botanic Society, and Fruit will soon regain its wonted position at Horticultural exhibitions. What can be more absurd than the present arrangements at Chiswick? No prize is offered for a collection of Fruit, and consequently the Ingrams, Flemings, Spencers, Moffats, and a host of large market growers, are either driven from the exhibition altogether, or are compelled to enter the lists with small but not less meritorious growers, and hence, instead of several large collections, producing in themselves a magnificent display, the exhibition is frittered into separate dishes, many good enough certainly, but in no way bespeaking the pomological riches of some of the great gardens of this great country. The great growers of Fruit, like the great growers of Plants, must be encouraged, and if the Horticultural Society neglects the duty for which its "Charter" was granted, the Council must not be surprised if the Royal Botanic Society does that for which its "Charter" was not granted. We make these remarks at this season, because it is the last occasion upon which we shall have to write upon the subject, and with the hope that the Council of the Horticultural Society will place the arrangement of their schedule another season in the hands of competent and disinterested individuals, who have neither private picque nor jealousy to prevent their doing that which they consider right to promote the interests of the Society and horticulture generally. The officers of the Society brought the exhibitions, but a few years back, to "a beggarly account of empty benches." Again, florist's flowers are almost excluded; and if care be not taken, it is not improbable that other things will decrease in quantity. Liberal prizes judiciously awarded are the only things which can maintain the celebrity of the Chiswick *fêtes*; but let them once more be reduced to what they were a few years back, and they are gone for ever.

To return to the exhibition:—The collections of stove and greenhouse plants were very rich, much more so than we could have expected to have seen them, after such parching weather as that which we have lately experienced. In the large collections the competitors were, again, Mrs. Lawrence and Mr. Colyer; but on this occasion the Ealing Park collection was obliged to succumb to the superior cultivation of its formidable rival. Both were very splendid, but Mrs. Lawrence's, containing several plants of a weedy and ineffective character, the choice and compact specimens from Mr. Cole were considered, and justly so, the best. Among his most prominent and meritorious plants must be mentioned Dipladenia splendens, and crassinoda, magnificently bloomed and coloured. Allamanda grandiflora, cathartica, and Schottii, in excellent condition; Erica retorta and gemmifera, not quite sufficiently in bloom; three Aphelexes, in fine order; Æchmea fulgens, with four flower spikes; Ixora coccinea, a splendid plant; and crocata, scarcely inferior; the gaudy scarlet Kalosanthes, with Rondeletia speciosa, and several other things. In Mrs. Lawrence's collection, the finest plant was, doubtless, Ixora javanica, a splendid specimen of cultivation; Stephanotis floribunda, beautifully bloomed; three large Allamandas, and two Sollya linearis, anything but effective; with Pimelea decussata, Franciscea acuminata and augusta, Crowea saligna, and a large bush of Phœnocoma prolifera. Mr. Stanley, gardener to H. Berens, Esq., had a large collection; but the plants, though neat, were very small.

In the collections of twenty plants perhaps the most beautiful thing was Pleroma elegans, with its brilliant true purple flowers, in the collection of Mr. Green; with which were also associated fine examples of Erica Massoni, Æschynanthus pulcher, Ixora coccinea, Stephanotis floribunda, and the singular and very pretty Dipladenia atropurpurea. A second very neat group was sent by Mr. Taylor, in which we noticed Allamanda cathartica, Dipladenia crassinoda, Phœnocoma prolifera, Ixora coccinea, Erica metulæflora bicolor, a fine plant, Azalea Gladstanesii, Cyrtoceras reflexum, and the delicate Sphenotoma gracilis. In the groups of ten plants the finest were Leschenaultia formosa, Pimelea Hendersonii and decussata, Rondeletia speciosa, and Polygala cordata from Mr. Williams, gardener to Miss Trail; Kalosanthes coccinea and Phœnocoma from Mr. Croxford; Gompholobium splendens, Pimelea decussata, and Allamanda cathartica, from Mr. Laybank; and Schubertia graveolens and Chironia glutinosa from Mr. Speed.

Of Heaths two splendid collections came from the gardens of Mr. Rucker and Mr. Quilter, the merit in which was so even as to have equal first prizes awarded to them. Nothing could be much finer than Mr. Quilter's retorta major, and metulæflora, and the same may be said of tricolor Leeana and elegans; Mr. Leach had a matchless plant of Erica obbata, the finest of white Heaths, a huge Parmentieriana rosea, several varieties of tricolor with eximia and Vernonii. Heaths were also contributed by Mr. Williams, Mr. May, Mr. Cole, Mr. Dennett, and several others; and, in the Nurserymen's class by Mr. Epps, Messrs. Rollisson, and Messrs. Pamplin.

New plants were not numerous, but Mr. May, gardener to Mrs. Lawrence, had a noble plant of Ixora javanica; Messrs. Rollisson Pharbitis limbata, a very lovely purple flower margined with white; Messrs. Henderson, their Begonia cinnabarina, in fine condition; Hemiandra pungens, from the Wellington nursery, and Magnolia fragrantissima, and Thyrsacanthus bracteolatus from Messrs. Rollisson; the same gentlemen had also a fine Nepenthes distillatoria. Of single specimens, Mr. May had Stephanotis floribunda an immense plant; Mr. Williams, a matchless Leschenaultia formosa, most admirably managed; Mr. Dennett, three fine Kalosantheses; Mr. Kinghorn, Leschenaultia arcuata, a curious and now scarce species; and Messrs. Pamplin, a finely bloomed plant of Allamanda cathartica.

Orchids were less numerous than usual, still a very effective display was there. In collections of twenty-five plants, Mr. Mylam, gardener to S. Rucker, Esq., stood pre-eminent as usual, and had noble plants of Aerides odoratum, maculosum, and quinquevulnerum; Phalænopsis grandiflora, the singular Maxillaria tenuiflora, Cymbidium pendulum, Saccolabium Blumei and guttatum, the rare Odontoglossum Karwinskii, Vanda Batemanii in stately grandeur, Anguloa uniflora with its pure ivory blossoms, with Cirrhæa fusco-lutea, Lycaste tetragona, Cycnoches ventricosum and Oncidium Lanceanum. A second group came from Mr. Williams, among whose plants we noticed Saccolabium guttatum, Dendrobium secundum, densiflorum, and moschatum, Brassia Lanceana and Wrayæ, Phalænopsis grandiflora, and a good specimen of Barkeria spectabilis. Collections of fifteen Orchids came from Mr. Blake, gardener to J. H. Schroder, Esq., and Messrs. Rollisson; Mr. Blake produced Vanda teres, Burlingtonia venusta, Acineta Humboldtii, Vanda tricolor, Angræcum caudatum, Calanthe masuca, Cattleya Mossiæ, and Dendrobium chrysanthum. Messrs. Rollisson had Broughtonia sanguinea, Phalænopsis grandiflora, Dendrochilum filiforme with curious long green tails, Miltonia spectabilis, Peristeria cerina, and Burlingtonia venusta. Smaller collections came from Mr. Barnes, gardener to R. Hanbury, Esq., and Mr. Dobson; and, of new kinds, Mr. Barnes sent Phalænopsis rosea, a small but very pretty plant; Mr. Loddiges, Saccolabium Blumei, and Aerides suavissimum, a very lovely thing; and Mr. Mylam, a very dark flowered Cypripedium.

Pelargoniums were very numerous, and for July in very fine condition. They were contributed in the amateurs' class by Messrs. Cock, Stains, Parker, and Robinson; and the nurserymen contributors were Mr. Beck, Mr. Bragg, and Mr. Gaines. *Fancies* came from Messrs. Robinson, Stains, Gaines, Ambrose, and Henderson; and *Capes* from Mr. Stains, and Mr. Parker. The most remarkable kinds were Salamander, Princess, Paragon, Avenger, Victory, Firebrand, Lalla Rookh, Mars, Painted Lady, Gipsey Bride, Constance, Armada, Rowana, Black Prince, Titus, Media, Rosetta, Hilax, Diana, Mont Blanc, Princess, Painter, Vanguard, Cassandra, Rosalind, Sarah, Cuyp, Star, Field Marshal, Duchess of Cleveland, Magnet, Ondine, Conspicuum, Lady Somerville, Norah, Marian, Alderman, Azure, Lord Gough, Dorcas, Centurion, Forget-me-not, and Pearl. *Fancies*—Defiance, Queen Superb, Reine de Francais, Fairy Queen, Bouquet tout fait, Kate, Medusa, Wintonia, Lady St. Germains, Orestes, Virgil, and Hero of Surrey. The Capes were bicolor, ardens major, quinquevulnerum, Blandfordianum, erectum, tetragonum, flexuosum, glaucifolium, and reniforme. Of Calceolarias, a nice stand came from Messrs. Henderson; and some Fuchsias, Gloxinias, Achimenes, and Verbenas, were also present, but nothing calling for special remark, indeed Fuchsias appear quite run out, and those growers who would take the trouble to select a collection from the old kinds, as Formosa elegans, Exoniensis, Riccartonii, Globosa, Venus Victrix, and the like, would probably find they had got something better worth notice, than many of the much vaunted new varieties; indeed, these interminable lists of varieties of florists' flowers must be abridged, and the sooner some of the leading nurserymen set the example of a radical reform the better.

Cut Roses were produced in great abundance, and in much finer order than we expected to see them. Messrs. Paul, Lane, and Francis put out their full strength; and Mr. Barnes, Mr. Terry, Mr. Parsons, and A. Rowland, Esq., had also fine collections. These we hope shortly to see in a growing state, and shall then be better able to judge of their merits. A quantity of cut Roses and Verbenas were sent by Mr. Ferguson, of Aylesbury, but for what purpose, except to show a want of taste in the arrangement, we do not know.

Of Fruit, a miscellaneous collection was sent by Mr. Fleming, gardener to the Duke of Sutherland; it contained fine Noblesse Peaches, May Duke Cherries, Figs, a dish of Grapes, and a fine Providence Pine. Mr. Bray, gardener to E. Lousada, Esq., sent six fine Pines; and a similar quantity was also communicated by Mr. M'Ewen, gardener to the Duke of Norfolk. Mr. Jackson sent a Trinidad Pine; and Pines were also sent by Mrs. Bailey Glanusk Park, Mr. Fleming, Mr. Spencer, and Mr. Drummond. Grapes came from Mr. Smith, of Dulwich; Mr. Henderson, gardener to Sir G. Beaumont, Bart.; Mr. Solomons; Mr. Holmes, gardener to E. Garrod, Esq.; Mr. M'Intosh, gardener to the Marquis of Exeter; Mrs. Grillion, Mr. Turnbull, Mr. Taylor, Mr. Moffatt, and Mr. Bain. Peaches and Nectarines, collections of four dishes, from Mr. Turnbull, Mr. Parker, Mr. Foggo, gardener to the Marquis of Abercorn, Mr. Munro, gardener to Earl Clarendon, and Mr. Slowe; Mr. M'Intosh had two superb dishes. The best Melons came from Mr. Barnes, Mr. Spencer at Bowood, Mr. Watson, Mr. Gorrir, and Mr. Monro. Strawberries from Mr. Lydiard, of Bath, and Mr. Kimberly, of Coventry. Mr. Wilmot, of Isleworth, had a new kind, called Prince Arthur, said to be an extraordinary bearer; Kitley's Goliah was also present, which proves to be a fine coloured Queen-like fruit; but in point of quality we tasted nothing equal to the Queen. Mr. Snow had some remarkably fine Cherries; and fruit of Stephanotis floribunda were sent by J. Lenhouse, Esq.

Review, and Miscellaneous Notice.

Prognostications of the Weather; or, Signs of Atmospheric Changes. By E. J. Lowe, Esq., F.R.A.S., &c. London: Longmans. P. 48.

The object of this pamphlet is explained in its title, and those who are interested in meteorological matters will find much curious and useful weather lore in its pages. The "Prognostications" are arranged in three classes: those deducible from observations of philosophical instruments; those indicated by the earth, atmosphere, clouds, heavenly bodies, &c.; and those indicated by the habits of individuals of the animal and vegetable kingdom.—M.

Rousselon Pear.—The habit of the tree is pyramidal; the branches vigorous, erect; the leaves about the usual size, oval elliptic, acutely pointed. The fruit is of a medium size, nearly as broad as long, in form resembling the Bergamote de Pâques; the eye forms a deep cavity, the stalk is short, moderately thick, also inserted in a deep cavity; the skin is green, merging to bright yellow and deeply tinged with red on the side next the sun, sprinkled with small red dots; flesh yellowish, delicate, and crisp; juice sweet, with a very grateful flavour. This variety is named in honour of M. Rousselon, and is found to be very productive. The fruit begins to ripen about the end of January, and continues good till April. It was raised and propagated for sale by M. Dupuy-Jamain, nurseryman, at La barrier Fontainbleau, near Paris.—*Revue Horticole.*

CLIMATE AND VEGETATION OF THE HIMALAYAS.

ABRIDGED, FROM THE "JOURNAL OF BOTANY," BY DR. BUSHNAN; TO WHICH IS APPENDED A LETTER FROM DR. HOOKER TO THE BARON A. VON HUMBOLDT, TRANSLATED FROM THE "GEOGRAPHISCHES JAHRBUCH" OF BERGHAUS, BY A. HENFREY, ESQ., F.L.S.

THE enterprising spirit shown by our indefatigable countryman Dr. J. D. Hooker, the worthy son of a no less worthy father, has excited no small degree of interest among all classes of society, and especially among those who devote themselves to the extension and enlargement of the boundaries of science. It is, accordingly, with no small degree of pleasure that we testify our esteem by joining him, though on a far distant shore, in his botanical mission to the East; and we commence our remarks with the record of his steps in his passage down the Ganges. The banks of that stream he describes as generally from ten to fifteen feet above the level of the waters, sloping and sandy on one side, but on the other precipitous, and formed of hard alluvium. Withered grass abounds on both banks. Wheat, Dhal (Cajanus), and gram (Cicer arietinum), Carthamus, Vetches, and Rice fields, are the staple products of the country. Though there are few bushes, the Argemone mexicana and the Calotropis were universally prevalent. Trees were rare, and these usually stunted in their growth. Fici, the Artocarpus, and some Leguminosæ were most generally noticed. Only two kinds of Palm appeared, the Toddy Palm and a Phœnix, the latter being characteristic of the driest locality.

The region he explored struck him by its extreme drought, as typified in the absence of Epiphytal Orchideæ, of Ferns, and of other Cryptogamic plants; of the first, he only met with three species. The prevailing genus of Cryptogamia was Riccia, a species of which swarmed everywhere in the beds of the river. There were some few water plants, which he terms handsome; a small Vallisneria, very different, however, from the V. spiralis; two Villarsiæ; and some Potamogetons. Fungi were extremely rare; only one Agaric was seen, though in spring they are said to be abundant in the plains. Of Mosses, only a Fissidens was discovered; Lichens were few, but no Hepaticæ. The absence of Cryptogamic plants he considers to be sufficiently explained by the extreme alternations of weather; the dry season being followed by the almost complete submersion of the country under water for miles, during the three months of the rainy season. Of Rice, he obtained twenty-six kinds, some of great beauty, and very different from each other.

Among the botanical curiosities, he mentions a pair of bellows "made entirely of the leaves of a tree, and used for smelting iron by the Aborigines of these parts. Nothing can prove their poverty more strikingly; the article is about the size of a very large cheese; it has a bamboo snout, and seems altogether a great curiosity."

From Dinapore, Dr. Hooker proceeded by land to Patna. On the road, he observed the reappearance of the Bengal forms of vegetation, to which, for three months, he had been a stranger; also groves of Fan and Toddy Palms (rare higher up the river); clumps of the large Bamboo, Orange, Acacia Sissoo, Melia, Uvaria longifolia, Spondias mangifera, Odina, and Euphorbia antiquorum and neriifolia? trigona? and indica, all of which were common road-side plants. In the gardens, Papaw, Croton, Jatropha, Buddlea, Cookia, Loquat, Litchi, Tongan, all kinds of Aurantiaceæ, Tabernæmontana, Plumiera, and the Cocoa-nut, indicated a change of climate, and an approach to the damper regions of the many-mouthed Ganges.

Dr. Hooker's great object in visiting Patna was to observe the Opium *godowns* or stores; the plant not being cultivated in India without a license. Premiums, however, are given for the best samples. "The Poppy," observes Dr. Hooker, "flowers in the end of January and beginning of February, and the capsules are sliced in February and March, with a little instrument like a saw, made of three serrated plates tied together. The produce is collected in jars, and all the arrangements are conducted with great care. During the north-west or dry winds, the best Opium is procured—the worst during the moist or east and north-east. The men employed work ten hours a-day, becoming sleepy in the afternoon; but this is only natural in the hot season, with or without Opium. They are rather liable to eruptive diseases, possibly engendered by the nature of their occupation. Even the best Indian Opium is inferior to the Turkish, and, owing to peculiarities of climate, will probably always be so. It never yields more than five per cent. of Morphia, whence its inferiority; but it is good in other respects, and even richer in Narcotine.

The highly cultivated state of the flat country in the vicinity of Patna does not allow of natural vegetation. Some few wild plants were gathered there, and the Mudar plant, (Calotropis), is abundant, The larger white-flowered sub-arboreous species prevail on the banks of the river, while the small purple-coloured variety was alone observed in the interior during Dr. Hooker's previous route. In appearance the species are distinct enough, but they are extremely difficult to recognise when gathered. The properties and nomenclature of the plant are not yet definitely ascertained; and the purple is alone employed by Dr. Irvine, who alleges that the white is inert. The natives, however, use it; and Mr. Davis of Rotas has cured with it eighty cases of leprosy.

The Doctor's course was next down the river to Darjeeling. On the 1st of April he arrived at Monghyr, which he describes as a very pretty town, backed by a long range of wooded hills, and noted for the drunkenness of its inhabitants, and their skill in manufacturing muskets. The abundance of Toddy Palms is here quite remarkable.

A few miles south of the town of Monghyr, are the Sita-kund (wells of Sita), hot springs. The water is pure, clear, and tasteless, with a temperature of 140 degrees. A precocious Sagittaria, and Pontederia were observed, irrigated by the warm spring as it passes through a meadow. Lemna and Azolla abounded at a temperature of about 90 degrees, and with them, Ranunculus sceleratus, and Rumex Wallichii. In the vicinity, and typical of dry rocks, were a columnar Euphorbia, Olax scandens, Guilandina Bonduc, Cardiospermum Halicacabum, a Tragia, and such like *vegetable thermometers.*

On the 5th of April he arrived at Bhaugulpore, where he went over the Horticultural Gardens, founded by Major Napleton. They extend to fifteen acres, and are well situated; give employment to fifty men, and are the means of distributing annually a great many plants and seeds. Of the trees used for shade and for ornament, the most conspicuous are the Tamarind—a superb specimen stands near the seed room—Tecoma jasminoides, Erythrinas, Adansonia, Bombax, Teak, Banyan, Peepul, Sissoo, Casuarina, Terminalias, Melia, Bauhinias. Of introduced species, English and Chinese flat Peaches, (pruned to the centre to let the sun in,) Mangoes of various sorts, Eugenia Jambos, various Anonas, Litchi, Loquat, and Longan, Oranges, Sapodilla; Apple, Pear, both succeeding tolerably; various Caubul and Persian varieties of fruit trees; Figs, Grapes, Guava, Apricots, and Jujube. Grapes were flourishing, but difficult of cultivation; suffering much from easterly winds, blight, and the ravages of insects.

The ornamental shrubs are Oleander, Bougainvillea, Tabernæmontana, Ruellia two species; Lantanas, Passifloras sixteen species and varieties; Verbenas, Ixora, Dracæna, Durantas, Quisqualis, Pergularia and Convolvuli, Hiptage, Plumbago, eleven kinds of Roses, Jatropha, various Euphorbias, Crotons, and Poinsettia, Thujas; Abutilon, and other Hibisci; Cassia Fistula, Jasminum, Lagerstrœmia, Buddlea, Clerodendrons, and such like. Of what we should call hardy perennials, annuals, and bulbs, the Doctor saw Maurandia, Lophospermum, and Thunbergias, fine Petunias, Sweet William, Mignonette, Pelargoniums, Pentas carnea, several Aristolochias, Eschscholtzia, Lupines, Clarkia, Schizanthus, Balsams, Violets, Clematis, Cannæ, Strelitziæ, and various Marantaceæ, numerous Amaryllideæ and Lilies, Erysima, Iberis, Stocks and Wallflowers.

Numerous Cerealia, and the varieties of Cotton, Sugar cane, &c. all thrive extremely well; so do many of our English vegetables. The Cabbages were sadly hurt by the green caterpillars of a white Pontia; as are also Peas and Beans. Strawberries were only in flower on the 5th April. Raspberries, Currants, and Gooseberries will not grow at all. Excellent Coffee is grown here, and Arrow-root equal to the best West Indian. The seed room is a perfect model of its kind; and, from the collection it contains Dr. Hooker was promised samples for the garden at Kew. The gardens at Bhaugulpore enjoy a high character, and furnish a model-school for gardeners.

Continuing his passage down the river Dr. Hooker visited Mirzapore, and, after encountering a severe storm on the 8th, he was *en route* for the Caragola Ghat. Approaching it the air became more moist, and the vegetation more verdant and bright. He was within the Himalaya range, and anxiously watching every change in the vegetation. The first indication he noticed of this was a Fern growing on the roadside, and the absence of several plants he had hitherto followed in his journey, especially the Zizyphi.

At Purneah, the road passed through some pretty lanes, with large trees of Eriodendron, groves of planted Guava and Anona bushes, a few Phœnix Palms, and a Calamus, the first our traveller had seen. Odina and Spondias with the Tabernæmontana were in abundance. Acacia arabica was rare. Castor Oil plants, and Calotropis he did not see. Mosses appeared on the banks, and Ferns were noticed sprouting above ground, though the hills were fully 100 miles distant.

Dr. Hooker here met with a Bamboo he had not before seen. It formed groves of straight trees, some fifteen to twenty feet high, thin of foliage, with a narrow erect *coma* not unlike Poplars. At Kishengunje, thirty-six miles from Purneah, only small pasture plants were observed affecting damp ditch banks:—Hydrocotyle, Sphæranthus, Cotula and Machlys, a small Hypericum, Gratiola, some Acanthaceæ and Scrophularineæ, Exacum, Oldenlandia, Polygona, and Oxalis. Clerodendron was common; and the erect Bamboo almost the only tree. There were neither Palms nor Bassia, and few Fici. The increasing dampness as the party neared the hills, was shown by the presence of three additional Ferns, and the growth of Paun or Betel Pepper, which now, for the first time, the Doctor saw in cultivation.

Dr. Hooker describes the Terai as a low, swampy, malarious belt, which skirts the base of the Sub-Himalaya, from the Sutlege to Brahmakund, in Upper Assam. Every feature, botanical, geological, and zoological, is at once new, on entering this district, and foreign to the plains of India. The change is sudden and immediate—sea and shore hardly more conspicuously different; nor, from the edge of the Terai, to the limit of the perpetual snow, is any botanical region more strictly defined, and clearly marked than this. Leaving Silligoree, an abrupt descent leads to the Mahanuddy river, beyond which the Terai as abruptly commences. The road winds through a thick brushwood choked with long grasses, (Saccharum, &c.), and Cyperaceæ. The trees are few, and chiefly Dalbergia Sissoo, and a scarlet-fruited Sterculia. But few spring plants were in flower; but among them were a sweet-scented Crinum, Asphodel, and a beautiful small Curcuma, in great profusion. Leaves of terrestrial Orchideæ appeared with Ferns (Lomariæ), Triumfetta, Sidæ, and similar weeds of hot damp regions. The banks of numerous small streams were richly clothed with brushwood and climbers, such as Convolvuli, Hiræa, Leea, Vitis, Menispermum, Cucurbitaceæ and Bignoniaceæ. Strange to say, this highly pestiferous district is inhabited by a race more robust than the Europeans in India—the Mechis, a mild, inoffensive, and industrious people.

About six miles distant from this, the road opens out upon a short flat, from which the Himalaya Mountains rise abruptly, clothed with forest to the base; the little Bungalow of Punkabarrie, our traveller's destination, nestled in the woods crowning a lateral knoll, above which, far as the eye could reach, rose range upon range of wooded mountain.

The ascent to Punkabarrie from this *steppe* was sudden and steep, and marked by a complete change in the soil and vegetation. A giant forest now replaced the stunted and bushy timber of the Terai Proper. The Careya and Shorea were the prevailing trees, with Cedrela, and the superb Gordonia Wallichii. Smaller timber and shrubs are innumerable; a succulent character pervades the bushes and herbs, occasioned by the prevalence of Urticeæ. Large Bamboos crest the hills. Shade is abundant, for the torrents cut a straight, deep, and steep course down the hill flanks. The gullies these traverse are choked with vegetation, and bridged by fallen trees, whose trunks are richly clothed with Dendrobium Pierardi, and other epiphytal Orchideæ, with pendulous Lycopodia, and many Ferns, Æschynanthus, Hoya, Saccolabium, Scitamineæ, and such types of the hottest and dampest climates on the face of the globe. Wrightia mollisima formed a small tree, now nearly leafless, with its curious hanging pods. The Saul is indeed a noble tree; Dr. Hooker saw no individuals at Paras-Nath to compare with these. Mosses were far from frequent, and the Lichens principally corticolous species. A few Agarici were the prevalent Fungi. Ferns, too, are more *season-plants* than the Doctor had expected; the majority showing their crozier-like heads. The white or lilac blossoms of the Convolvulus-like Thunbergia were the predominant feature of shrubby vegetation.

From Punkabarrie, a very steep and richly-wooded ascent of 3000 feet begins, where the Gordonia Wallichii, from its social habit, size, straightness of timber, and colour of its bark, was still the most attractive tree.

At the elevation of 1000 feet above Punkabarrie, the vegetation is extraordinarily rich. Shorea, (*Sal*), Gordonia Wallichii bursting into blossom, and Cedrela, Careya, and some others, are still the prevailing gigantic timber trees, and these scaled by climbing Leguminosæ, as Bauhinias, and Robinias spanning the forest with great cables joining tree to tree, whose trunks are also clothed with parasitical Orchideæ, and the still more beautiful Pothos, Peppers, Gnetum, Vitis, Convolvulus, and Bignoniæ. Of the most conspicuous smaller trees, the wild Banana is the most abundant; next comes a Pandanus? with a straight stem and a tuft of leaves, each eight or ten feet long, waving on all sides, but without flower or fruit. Araliaceæ, with smooth or armed slender trunks, and Mappa-like Euphorbiaceæ, spread their petioles horizontally forth, each terminated with an ample leaf some feet in diameter. Bamboo abounds everywhere: its dense tufts of culms, 100 feet and upwards high, are as thick as a man's thigh at the base. Grewia, Bradleia, Aquilaria, Mimosa and Acacia, Garcinia, shrubby Compositæ and Cinchonaceæ are very frequent; also Vitis, Cissus, and Leea, of several species, Hiræa, Gordonia, Eurya, Triumfetta, Hibiscus, Abutilon, Sida, Capparis, Kydia, Helicteres, Hovenia, Paliurus, Zizyphus, Colubrina, Cascaria, Crotalaria, Tephrosia, Guilandina, Uvaria, Desmodia, Flemingia, Mucuna, Dalbergia, Cassia and Bauhinia; Grislea, Lagerstrœmia, Sizygium, Momordica, Bryonia, Panax, Aralia, Hedera? Loranthus, Nauclea, Hymenodyction, Mussænda, Randia, Wendlandia, Oldenlandia, Ophiorhiza and others; Hedyotis, Hamiltonia, Pavetta, Coffea, Psychotria, Spermacoce, Rubia, Vernonia, Ageratum, Eupatorium, Conyza, Blumea, Diospyros, Rivea, Argyreia, and Convolvulus, Cordia, Tournefortia, &c. Of smaller shrubs, Acanthaceæ, are far the most numerous, then Fici, Euphorbiaceæ, Lauri, Mœsua, Embelia and Bœhmeria, Celtis, and various Desmodia, Hedysara, and other Leguminosæ. At this season, Monocotyledons are scarce: a few Calami and other Palms, large grasses, and more Cyperaceæ, Scitamineæ, and Curculigo, with parasitical Orchideæ, are the prevalent tribes. Among the herbaceous vegetation Cucurbitaceæ are especially numerous, Acanthaceæ, some Labiatæ, Balsamineæ, Asclepiadeæ, Apocyneæ, and Urticeæ. Along the cut roadside the Doctor gathered two Hydrocotyles, Piddingtonia, (which is surely not distinct from Pratia), Oxalis, Mollugo, Polygona, Compositæ, Impatiens, Desmochæton, Ageratum, Adenostemma, Bidens, Wedelia, and other such tropical weeds. Twenty or thirty species of Ferns were luxuriant and handsome. Foliaceous Lichens and a few Mosses appeared at 2000 feet.

A little below this a great change takes place in the vegetation, distinguished first by the appearance of a very English-looking Bramble; which, however, by way of proving its foreign origin, bore a yellow fruit. Scattered Oaks of a noble species, with large lamellated cups, and magnificent foliage succeeded, and along the ridge of the mountain the change in the flora was complete. Here (about 4000 ft.) our traveller entered the early spring flora of the middle region of the Himalaya, extending to the Alpine at 10,000 feet. His direction thence was northward, on a forest clad shoulder of the mountain rising 4000 feet higher in front. All the tropical and Indian vegetation was left below, and now succeeded that which marked the temperate and the Arctic Circle, deep and narrow gullies being the "thin partitions" that divided them. Dr. Hooker was here most forcibly reminded of an English spring. He had left the winter of the tropics; and here he saw the Oak flowering, and the Birch leafing; the Violet, Chrysosplenium, Stellaria and Arum, Vaccinia, the Wild Strawberry, Maple, and Mimulus, Geranium and Bramble; the roadsides and hedges carpetted with Mosses and Lichens.

Along this range our author met with the first Fern tree; and he says:—"This most beautiful object delighted me, whether because it was an old friend, or from its extreme beauty and grace; the latter, I expect; for I had already seen so many Tree-Ferns, and in so many parts of the globe, the Atlantic Islands and shores, the Cape, America, Australia, and New Zealand, that if any one's appetite for so attractive an object could be palled, it should be mine. This species, as all others known to me, is far inferior to the Tasmanian in appearance; it seldom reaches more than forty or fifty feet,—the trunk is but three or four, instead of twelve or fourteen in girth, of a dark blackish, instead of a rich ochreous brown tint, and the feathery coma is ragged in comparison. I presume it to be nearly allied to Alsophila gigantea (*Wall*): it never occurs much below 4000 feet that I have seen, and ascends to nearly 7000."

From Kursiong the mountain is ascended through a magnificent forest of Chestnut, Walnut, Oaks, and Laurels. It would be difficult to conceive a grander mass of vegetation:—the straight shafts of the timber trees shooting aloft, some naked and clean, with grey, pale, or brown barks; others literally clothed for yards with a continuous garment of epiphytes, with all kinds of foliage, and one mass of blossoms, especially the white Cœlogynes, which bloom in a profuse manner, and literally powder the trunks with snow. More bulky (to appearance) trunks were masses of interlacing climbers—Araliaceæ, Leguminosæ, Vitis, and Menispermum, Hydrangea, and Peppers—their once supporting tree having decayed away. From the sides and summit of these, supple branches hang forth, either leafy or naked; the latter resembling cables flung from one to other trees, swinging in the breeze, their rocking motion increased by the weight of great bunches of Ferns or Orchidaceæ, perched aloft in the loops. Perpetual moisture nourishes this dripping forest; and here pendulous Mosses (Hypna and Neckera) and Lichens (Borrera and Usnea) are first met with, and in inconceivable profusion.

Pacheem, at an elevation of 8000 feet, is fertile in subalpine plants. Piddingtonia, Chrysosplenium, Viola (of a different species from that at Kursiong), Lobelia, a small Geranium, Fragaria, little Polygona, five or six Rubi, Arum, Paris, a delicate little Isopyrum, Convallaria, Uvularia, Disporum, Carex, Creeping Urticeæ, and succulent great ones too, Arenaria (or Stellaria), Ainsliea, Rubia, Vaccinium, and various Gnaphalia. Of small bushes, Corneæ, Caprifoliaceæ, and Araliaceæ predominated, with Symplocos and Limonia, Eurya, bushy Rubi, having simple or compound green or beautifully silky foliage, Hypericum, Hydrangea, Berberis, Lonicera, Artemisia, Urtica, Adamia cyanea, Viburnum, Sambucus, dwarf Bamboo, &c.

The climbing plants were still Panax or Aralia, Kadsura, Saurauja, Hydrangea, Vitis, Smilax, Ampelopsis, Polygona, and, most beautiful of all, Stauntonia, with pendulous racemes of lilac blossoms. Epiphytes were rarer, still Dr. Hooker found Cœlogyne, and several other genera of Orchideæ, Vaccinia, and a most noble white Rhododendron, whose truly enormous and delicious lemon-scented blossoms strewed the ground. The trees were one-half Oaks, one-quarter Magnoliæ, nearly another

THE [illegible] OF THE BUNDERPOOR [illegible] VALLEY
[illegible] JUN[illegible]

[illegible] Laurel, with scattering of Birch, Alder, Maple, Holly, [illegible] Pyri, Cerasus, Styrax, Symplocos, and Limonia. Neither Juglans, Tree-ferns, nor Castanea a[illegible] so high; nor, of course, Palms or Bananas, Pothos or Peppers. The rarity of Leguminosæ was most remarkable, and must be a prominent feature in the vegetation of this region; it is too high for the tropical tribes of the warmer elevations, too low and too moist for the Galegeæ and Astragaleæ; still, why are there no Viceæ, nor the pretty Parochetus, he had left only 1,000 feet below? Except Isopyrum, Ranunculeæ were totally absent, though there may be a few species of Clematis. Cruciferæ, too, were wanting; and more remarkable still [illegible], of which our traveller found but one native species [illegible] Trifolium flourished where accidentally disseminated in artificially cleared spots.

The cryptogamous vegetation, though most luxuriant, Dr. Hooker describes as very inferior to that of New Zealand, where, he says, "he could gather double the number of noble Ferns in an hour, than he could here in a day." The superiority of this region, consists in the number of forest-trees and dicotyledonous plants, in the absence, in the usual proportion, of such plebeian orders among them as Compositæ, Leguminosæ, Cruciferæ, and Ranunculaceæ, and of Gramineæ among monocotyledons; and above all, in the predominance of the rarer and more local families, Magnoliæ, arborescent Ericeæ, Araliaceæ, Corneæ, Caprifoliaceæ, Saxifrageæ, and Ternstrœmiaceæ.

The magnificent grandeur of the scenery of old Darjeeling seems to have made a profound impression upon our traveller. It is delightful to follow him in his description; while his little touches and comparisons, and tender allusions to his far off English home, proclaim him a man of deep feelings and warm and kindly heart. We regret our space obliges us to confine ourselves to his Botany.

The lofty mountain ridge upon which Darjeeling stands is called Sinchul. Elevated at least 1,000 or 1,500 feet above Darjeeling, it is even more subalpine than Pacheem, but still does not rise into the regions of Ranunculaceæ, Primroses, or herbaceous Saxifrages. A heavy forest covers the whole summit, hoary with pendulous Lichens and Mosses; and its main feature consists in the groves of the large silvery-leaved white Rhododendron, and the purple-flowered Magnolia. A new species of Balanophora (B. cyathoides, *MS.*), with the leaves forming a cup-shaped involucre, or sheath, half-way up the flowering stem, grows at an elevation of 8-9,000 feet; it is monœcious, and flowers in May and June. B. dioica, *Wall.*, grows above Darjeeling (alt. 7,500 feet), and flowers in July and August. Two other species, B. typhina, *Wall.*, and B. polyandra, *Griff.*, inhabit lower levels, and flower in September.

A narrow path winds to the double summit of Sinchul, passing through woods, and among a greater proportion of Corneæ, Hydrangea, and Ilex, mixed with Rhododendrons, and three species of Magnolia. Ferns are very luxuriant, Hymenophylleæ on the trees, Marattia and Sphæropteris and many Aspidia and Davalliæ on the ground. The commonest Aspidium is caulescent. Several kinds of Celastrus are very frequent under-shrubs, but none in greater profusion than a new species of the Japan genus Helwingia.

The profusion of Arums in this region is quite remarkable. They are noble plants, and will, it is hoped, reach Kew in safety. The most abundant on Sinchul (A. speciosum) is triphyllous, and like Wallich's A. speciosum. Paris is another English spring genus now in flower, and very plentiful at this elevation (7-2,000 feet). Falconer says it is the P. polyphylla; it is a grand thing, the stems three feet high, a whorl of seven or ten leaves, with three to five sepals, as many petals, three to eleven stamens, and two to six carpels. Dr. Hooker counted the number of parts in some thirty specimens, for Professor Henslow, whose ingenious theory of the formation of the flower of P. quadrifolia will find confirmation in the irregularities of this. Disporum and Convallaria are both abundant, and the latter very beautiful, for it bears an immense raceme of white flowers, similar to those of Muscari, but as large as the C. majalis; the raceme is often a foot long. Another species is Wallich's C. oppositifolia. The leaves of an Ophiopogon were very abundant, as of various Begonias, Didymocarpeæ, but none in flower. Mr. Edgeworth's genus, Streptolirion, grows in amazing profusion a hundred yards above Darjeeling, to which station it hardly descends.

Three species of Carex occur on Sinchul, but no grass. The mountain is also above the region of Cucurbitaceæ, which ascend to 7,500 feet, but not of Smilax, and some other sub-tropical genera. Ficus and Pepper both reach the base of the ridge, 7,500 feet, but are not found higher. By the little streams, Viola, Lobelia, Chrysosplenium, and Mimulus, form verdant masses with chickweed. Five species of Rubus ascend to the summit: amongst them is a creeping white-flowered one, bearing large scarlet fruit. Lardizabala is common, and a small Ampelopsis, and a tufted Vaccinium. Dr. Hooker did not observe a single Labiate, or Leguminose, and scarcely a Composite plant, except Ainslica, one species of which flowers in spring, the other in autumn. Urticeæ were very numerous and succulent. Some small trees of Styrax? bear a profusion of white flowers, which lie like snow on the ground underneath: there are two species about Darjeeling. But of all things found here, the most remarkable objects are the vivid red outer sepals and petals of the Magnolia. This magnificent tree is leafless during the flowering season (April), presenting only a few irregular branches from a trunk sixty to eighty feet in height, covered with a whitish bark. The flowers (resembling those of the Lotus) are terminal, oddly inserted, and, as well as their peduncles, brittle, and therefore easily damaged by the wind. At this height the common white-flowered Michelia is not so abundant as lower down, at 7,000 feet; where its frequency causes the trees, during its blossoming time, to look as if snowed upon. Like our Hawthorn, &c., it does not bloom with equal profusion every year.

The Rhododendron argenteum abounds on this ridge. It is inferior in size to the Oaks, Magnolias, Ilex, Pruni, and Pyri of the region, but individually it is far more abundant. As is the case with most of the genus, it branches from the root: in this species the branches are as thick as the human body, or nearly so, covered with a pale pinkish papery bark, twenty to forty feet high, inclined, compressed, sparingly divided towards the apex: the ramuli, also, are few, and leafy only at the apices.

Fungi are immensely numerous in the moist woods, especially the Hymenomycetes. Three or four smaller species of Lycoperdon are common; but the Bovistineæ, as a tribe, want more sunny pastures. Agaricus campestris rarely appears, and only in the artificially grassed paddocks near the residents' dwellings is it abundant. Mucedineæ are amazingly intrusive in the valley of Nepal and on the plains. Hitherto Dr. Hooker had met with only a single underground Fungus, this tribe probably preferring the drier and the warmer woods to these excessively humid ones. Some of the Agarics here assume anomalous, very beautiful, and apparently normal forms.

As in most tropical and sub-tropical countries, the Hymenomycetes here are far the richest tribe in species and individuals, excepting possibly the Coniomycetes and Hyphomycetes, which seem to be neglected, of necessity, by even those travelling naturalists who can devote any time to the observation of Fungi. Besides Agaricus, including many of its sub-genera, there are Lentinus, a few Boleti and Polypori, Hexagonium, and Merulias, Hydnum, Thelephora, and Auricularia, Clavaria, Tremella, and Exidia; Gasteromycetes are much rarer; Dr. Hooker did not meet with the ubiquitous genus Nidularia, Ascomycetes were far from abundant, as also Pezizæ, Helvellæ, and Sphæriæ. Dr. H. found no necrophytes, as Caterpillar Fungi, &c.

Billets of decayed wood were noticed beautifully phosphorescent, from the presence of a Mycelium. The Agarici were considerably larger than those seen elsewhere—the pileus of one was observed fourteen inches in diameter.—J. S. B.

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Dr. Hooker has contributed some valuable facts to Physical Geography, and a map and plan of the Himalayas in his letter to the Baron von Humboldt, a translation of which we think will be acceptable to our readers. Writing from Darjeeling, he says :—

"Between 80 and 90 degrees east longitude (from Greenwich), lie the following masses in this order*:—1. Djawahir; 2. Dhawalgiri; 3. Gossainthan; 4. Deoghangha; 5. Kanchain; 6. Chumalari; and 7. two unnamed, not accurately measured peaks in Bhotan. Hodgson pointed out that the great rivers of the sub-Himalaya have their sources in those masses; that the water descends from the opposite declivities of each of two neighbouring peaks, and converging, as they pass through into Sub-Himalaya, form delta-like basins. We propose to divide the whole Himalaya, by means of these basins, not merely geographically and ethnographically, but also in reference to zoology and botany.

For example, Sikkim is the basin of the Teester, the tributaries of which all arise from Kanchain and run towards the east, to meet the waters of the Chumalari, which are thrown toward the west. Further west, we observe that the waters from the facing declivities of contiguous peaks meet within the sub-Himalaya. Here this is not the case; but between the great Southern spire of the Kanchain (Singalelah), stretching from its summit to the plains, and the great southern branch of the Chumalari, which also reaches to the plains, it is one water basin. To make this more clear, I send a little sketch of a map, which may also serve to explain my most recent excursions. (See page 12.)

Unfortunately, the season of 1848 was so bad, and the Rajah of Sikkim so obstinately opposed my intention of visiting the Kanchain in Sikkim, that I was compelled to put off my undertaking till the end of the month of October, and to make a detour through Nepal. In this way I became acquainted with two Thibet passes,—the easternmost in Nepal,—and was led to an investigation of the north-western, western, south-western, and finally the southern limits of the eternal snow resting upon the great mountains. My map is scarcely finished; the toil of such a task within mountain-chains where no known point is ever visible, is, as you may imagine, very great.

Going from Darjeeling to the west, I climbed the Singalelah chain of the Kanchain to a height of 7000 feet, and descended to the tributaries of the Mai and Myong. Then I turned northward, with the intention of going along the chain to Kanchain, before I turned westward to the passes. My foolish bearers ran away from me here; they were people from Bhotan, and, I believe, are the only race that can be made use of both in the hot valleys and the mountains. I was therefore obliged to be patient, and wait till the middle of November, on a mountain 11,000 feet high, where I employed myself in meteorological observations and botanical rambles, while the remainder of my people had gone to distant villages to find other bearers.

When I had enough of that, I packed up my things and set out on my road again, which ran westward, through deep defiles, (3000 feet above the sea), and leading up a very high cross chain running out from Singalelah, ascends to a height of 11,000 feet. Thus I made my way to the Tambur river, in the valley of which runs the eastern highway leading from Ham (or Ilam?) to Walloong, on the Thibetian

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* 1. *Kanchain-* (Kunchin- or Kinchin-) *junga* is by far the highest of the peaks that have as yet been accurately measured;

1. According to the measurements from three stations. 28,125·7, 28,182·6, and 28,192·5 feet;
2. According to the measurements from four stations in Sub-Himalaya, 28,177·4, 28,183·0, 28,162·5, and 28,212·8 feet; mean result 28,176·6 feet.

The proof obtained gives the following result :—

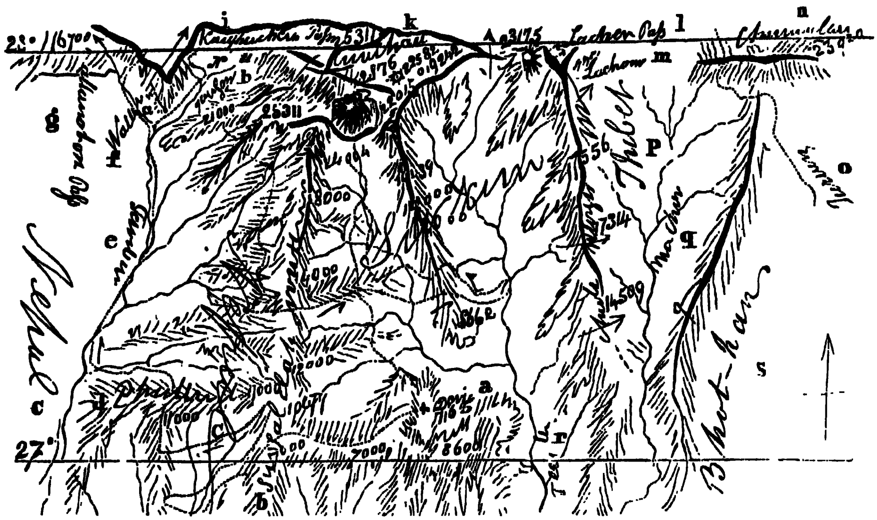
Length of the base line, by measurement .	36,685·77
The same according to a triangular measurement, extending over more than 350 miles (resting on another base), . .	36,685·30
Difference in English feet, ...	0·47

2. *Dhawalagiri* was measured anew, not long since, by Colonel Waugh. He believes that the height has been estimated considerably too low, and that it will be found as high as the Kanchain. *Dhawalagiri*, *Deodangha*, and Kanchain are nearly of a height, being about 28,000 English feet. None of the other peaks approach these.

3. There is a peak between Gossainthan and Kanchain, visible both from the Nepal valley, where it is called *Deodangha*, and from Sikkim. This has not yet been measured, and has not been shown in any map. But Colonel Waugh conjecturally regards it as a little higher than Kanchain and Dhawalgiri.

4. Of *Djuwahir*, or Nanda-Deur, I cannot tell any thing new; however, in any case, it must be included in the second class of the Himalaya peaks, in regard to height, being 24,162 Paris feet.

border. Reaching this river, at an elevation of only 2,500 feet above the sea, I ascended it, making my way as well as I could, through a tropical vegetation, which reaches to constantly snow-covered spurs of the Kanchain. On the 25th of November I arrived at the boundary of Rice-cultivation and Hindooism, and the commencement of a temperate zone, and of the Bhothia people. The change from buffalo and rice, to beef and wheat was sudden. Ascending still higher, through stupendous mountain defiles, toward Walloong, the second transition from beef to bison, (the Yak, the progenitor of which, is the undescribed wild bison of the Thibetian plains), was more gradual.



a. *Darjiling.*
b. *Singalelah Range.*
c. *Nepal.*
d. *Phulull.*
e. *Tambur.*
f. *Walloong.*
g. *Wallanchoon Pass.*
h. *Yangma.*
i. *Kanglachem.*
k. *Kanchain, Kinchin.*
l. *Lachen pass.*
m. *Lachoom pass.*
n *Chumalari.*
o. *Turner.*
p. *Thibet.*
q. *Machoo.*
r. *Teesta,*
s. *Bhot-han.*
t. *Plains of India.*
u. *Perpetual snow.*

The broad black line indicates perpetual snow.

Walloong is the Cis-Himalayan commercial depot of the Bhothias. Here I was received with mistrust, and obstacles of all kinds were opposed to my design of going toward the passes, which were the more effective that the season was far advanced, and they withheld provisions from me. Luckily I had still a dozen Bhotan men with me, a parcel of scamps who would frighten any one, and who, by insulting, abusing the authorities, and threatening to break open the warehouses, placed me in a condition to start for the passes after a halt of two days.

The village of Walloong lies about 11,000 feet above the sea. The pass, situated a day and a-half's march on the further side, is about twelve miles W. N. W. from the Kanchain peaks, and twenty-five from the latter. We reached the summit in two days, with much toil, for the ground at 12,000 feet was deeply covered with October snow, which at 13,000 feet does not melt until the following March. The summit of the pass is 16,700 feet high, but still three day's march distant from the plain of Thibet, which is here cut off by two mighty chains, branches of the Kanchain, which, of less elevation than my point of view, stretch in a northward direction toward the plain. Mountains and valleys were now covered deeply with snow.

The limit of the eternal snow, at this point, is, as nearly as I could determine, 14,500 feet above the sea; and, judging from what I saw afterwards, I believe this is near the truth, although it is impossible to speak with exactness—by the bounding of the snow which had fallen in October.

This is not the most eastern of the passes leading to Thibet, and therefore not the nearest point to Kanchain attainable in eastern Nepal. I resolved to visit, on my return to Walloong, the valley lying eastward of this, where a higher—but seldomer used pass led to Thibet. Descending the Tambur, I penetrated, in a north-east direction, into the Yangma valley, which expands into a broad, treeless ravine, wholly filled up with lake beds. These beds are bounded by enormous rocky dams, which have been hurled across the valley when it was all under water. To express it briefly, while the Thibet Plain has accumulated its drift-deposits, (1000 feet thick, by actual measurement, in western Thibet), the waters, which stood at a height of 15,000 feet in the Yangma valley, have left parallel roads or banks, on the flanks of this valley, which are as fine as those of Glen Roy, in Scotland. Lateral ravines have washed out masses of rock into the valley, which have been piled up into mountains, and perfectly bridged it over, so that, on the subsidence of the waters, they formed dams. The terraces are perfectly parallel on the two sides of the valley, above the lake beds; they ascend like steps, along the steep declivities, and are everywhere strewed with vast blocks of rock. In the side valleys, one sees now only small patches of glacier ice, which have deposited drift and debris, just in the same manner as the vast beds twenty yards long, have been deposited by the greater ice.

I have here sketched a plan of the valley, and shown, that these bridges across the valley, a mile long, one 800 feet high, and all composed of masses of rock, heaped up too irregularly to allow of a vegetation extending to them, are a real effect of mountain ice, which has been flooded out from the side valleys.

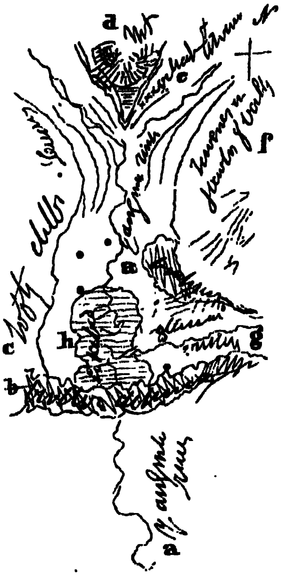
These astonishing records of the power of glacier ice, admit of no other explanation; and many particulars so vividly remind me of the shores of the Antarctic Ocean, that I cannot have any doubt of the correctness of my conclusions.

The village of Yangma, at the fork of the terraced valley, lies above the limit of shrubby plants, and stands on the flanks of a level terrace of drift and rocks, rising 300 feet above the bottom of the valley, and two miles long. The village is 13,700 feet above the sea, (according to the reading of two barometers, and the determination of the boiling point), at which height, Wheat, Peas, and Radishes were cultivated, the harvest falling in the month of September.

From hence I turned in the north-western direction, toward the Kanglach Pass, which leads to Thibet; but, on account of the deep snow, had great difficulty to attain the height of 16,000 feet. Three dry lake-beds in this valley, (eight in all,) were of exactly the same origin as those below the village. The uppermost, at 16,000 feet was quite filled with snow, and surrounded by glacier mountains.

I examined the phenomena as well as I could in deep Winter, and as was allowed by our scanty store of provisions, and then turned back down the valley; not, however, to the Tambur river—for opposition still prevailed—but I resolved to return to Sikkim over three intermediate shoulders of the Kanchain; I was only able to obtain seven days' provision for my fifteen people, and this we carried on our backs.

YANGMA VALLEY.



a. *Yangma River.*
b. *Boulder Deposits.*
c. *Lofty Terraces.*
d. *Mountains.*
e. *Village and Terrace.*
f. *Terraces on Flanks of Valley.*
g. *Glacier Valley.*
h. *Lake bed.*

From Yangma valley we set out S. W. over the Nango shoulder of Kanchain, at a height of 15,760 feet, but again had great difficulty on account of the snow. My coolies trembled at the frost. We were overtaken by night, and thus compelled to pitch our camp under the opposite peaks. This branch chain runs in the Nango mountains, to a height of about 21,000 feet. We crossed it quite close to this mountain, and descended to the Kambach valley, a terrible ravine, and to a little village, by the Bhothia inhabitants of which we were received kindly, although they were unable to spare us food, since they expected daily to be snowed up (height about 12,500 feet). The winter fall often amounts to 15 feet here, and yet Wheat, Peas, and Radishes are cultivated. I found a *Larix* and ten species of *Rhododendron* in this valley. I have now twenty Sikkim species of the latter genus. The glacier chains were here as splendid as in the Yangma valley.

Here we turned off to cross another shoulder of the Kanchain, named Choonjerma, which cost us three days. Jummo, the highest peak of this chain, is 25,311 feet above the sea. We passed over its shoulder at 15,300 feet, and 8 miles from its summit. The pass was doubly heavy with snow, and very bad; we were again benighted on the crest, but by the light of the moon's first quarter we got out of the snow, and camped below it.

We now descended to the Walloong valley, with the intention of proceeding down it to the village of the same name, and from thence to cross over the great south-east of the Kanchain (called Singalelah) to Sikkim. As bad luck would have it, we had but one day's provision left; we found, the village buried in snow, and its inhabitants fled to the nearest villages in Nepal. It was impossible to cross Singalelah from here, as this could only be done at a height of 18,000 feet, so that no choice remained but to go down the valley S. W., and to seek the first village, which we reached on the third day in great need.

My object was now to find the way back to Sikkim. We went on southward, crossing every lateral branch of the Singalelah, at last to Derr (?), where we found a long deserted road by which the Ghoorkhas had penetrated many years before in their devastating inroad into Sikkim. Provisions were very scanty, but we managed to obtain Rice for five days. A road opening through the jungle, we reached with great difficulty on the third day the summit of the chain, at a height of 11,000 feet, and descended in a mighty snow-storm to the western tributaries of the Teesta, or Great Runjeet river. From here I went over the Great Runjeet, (3,000 feet,) and the south eastern spur of the Kanchain to the Teesta, where the bed of this river is about 2,000 feet high, and where I met the Rajah and my good friend Dr. Campbell, the political resident in Darjeeling. It was a real pleasure to chat with him after so long an absence. He had come here by a way never before traversed.

The Rajah did not receive us very civilly; and he had thrown every possible obstacle in the way of Dr. Campbell's affairs. His poor court was altogether Lhassaic, and aped the Chinese dignity; though in a very contemptible manner.

I heard much that was new about the plains of Thibet from his followers. Routes toward Lhassa, and from there to the north, north-west, and west, all agree to show that the Yarou (Dzangbo) is the Brahmaputra. The Vine actually grows at Lhassa, and that is warm for a Thibet climate. Rice is cultivated in the eastern provinces of Thibet; the Mulberry, with the silkworm, and a species of Tea plant, is certainly found on this side of the Peling chain.

Dr. Campbell returned with me to the Great Runjeet River; we were two days on mountains of 12,000 feet, during the journey. On the Great Runjeet we visited the Lama monastery, drew, and described all that was remarkable about it, and obtained much interesting information from the Lamas, who were hospitable and polite, and much venerated by all people, they possess large property in land.* Dr. Campbell was obliged to return from here, southward to Darjeeling, while I, full of the desire to visit the south side of Kanchain, turned toward the north.

After many days difficult travelling, through an almost impassable country, I pitched my tent at an elevation of 14,000 feet, on a steep and naked ridge, on the slopes of the great mountain covered with snow, and everywhere exhibiting abundant evidences of great glacial floods, which had once washed all before them. The earth was frozen to a depth of sixteen inches; but a thermometer which was sunk to a depth of two feet six inches, stood considerably higher (than the freezing point.) I hoped to be able to stay here a week; but, after three days' observations, the snow fell so powerfully that we were obliged to prepare hastily for a return; this was in the middle of January; it required two days of great effort to descend into the valley at the foot of the mountain.

Then, returning by a different route, I visited the sacred Lake of Sikkim, and had the testimony of my own eyes, of the simple worship of the Buddhists. From there I proceeded to the oldest monastery in Sikkim, where I passed some days in the society of the monks, and finally returned to Darjeeling.

This entire journey was through a land which has never been explored before; and, though I am a capital walker, I did not advance daily, on an average, more than five miles in a straight line, *i. e.*, not much more than an hour's journey, though three miles were passed over every hour, and I was five or six hours on the road every day.

I made meteorological observations hourly from sun-rise to 9 or 10 A.M., and from sun-set to 10 P.M. During my days of rest they correspond, with the exception of a few interpolations, with simultaneous observations in Calcutta and Darjeeling. Two barometers that I had with me proved excellent, and some of the results of the warmth of the air and the temperature of the mountain streams, as well as of a thermometer, which was sunk two feet six inches into the soil at many stations, at the level of

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* The entire population consists of Bhothias; but we find a great distinction between races of Bhot; for they are, I. Proper Thibetians—Trans-Himalayan—in numerous races; and II. Cis-Himalayans—Bhothias, who recognise their trans-Himalayan origin; and there are 1. Salt merchants of Nepal, living at elevations of from 7 to 14,000 feet; 2. Sikkim Bhothias, who are agriculturists, and never reside above 6,000 feet; and 3. Lamas, who immigrate from Thibet, and furnish the sacerdotal order of Sikkim. Beyond these, the Bhotan nations towards the west (Bhotan is "Lho" or "Lhop"), are ignorant of the name Bhotan, (end of Bhote.) "Durma people" is the usual denomination. These are totally different in character from all the others; and, bad as my Coolies (bearers) were, many of the former were the most unmanageable, base, and selfish cowards I have ever met with.

We have also in Sikkim a population of Mongolian derivation: in the first place 1. Lepchas, a charming, simple, and attractive people, who dwell at elevations of from 3,000 to 6,000 feet, but never remain long in one place; and, who, worse than the Bhotians, are devoted to demon-worship, and speak a wholly peculiar dialect; then 2. Covehs, and 3. Mechi, both in Terai, who bid defiance to the fever of this district; further, 4. Huloos, 5. Geroings, 6. Murmis, and 7. Limbos, who properly belong to Nepal.

14,000 feet, will, as I hope, furnish important data. I also made other physical observations, such as, on the dew, the radiation, and with the photometer, and I kept a complete register of the wind.

Botany was always my first care, for I collected, noted the uses, and the local names in the Bhothia, Ghorka, and Lepcha languages; and, above all, measurements of altitude, for which the barometer or the sextant were constantly in use.

My collections are very rich from the temperate and sub-arctic zones, where the Rhododendrons form woods (!) at 10—12,000 feet, with, and even above some species of Pinus. The Fig ascends to 9000 feet, parasitical Orchideæ up to 10,000 feet, with Asclepiadeæ, Cucurbitaceæ, and many others, proving that the tropical genera ascend to a greater height in Sikkim than in any other region of the earth, which, in my opinion, is greatly owing to the uniformly great elevation of the sub-Himalaya, and, still more, to the vicinity of the ocean, and the prevalence of the south-east wind, which passes over the unbroken plains of Bengal. Species of Pinus are very rare. Balanophoreæ rise to 9000 feet; Palms to nearly 7000; wild Musa, and Tree-ferns to the same height.

I think I was tolerably industrious in geological matters. The appearance of the granite, which forms the peaks of all the mountains above 20,000 feet, and the astonishing contours of its projections along the main chain, and of the slope of every branch of the Kanchain, are wonderfully fine. Perpendicular cliffs of stratified rock, 4000 feet thick, of a brilliant red, and contorted in a manner unequalled elsewhere, are intersected by gigantic veins of quartz, porphyry, curite, &c. Isolated mountain masses of micaceous slate and gneiss are piled to a height of 20,000 feet, and all is on a scale of complication and vastness that bids defiance even to recollection. I saw no limestone, no fossils. The whole Himalaya here is formed of micaceous and aluminous slate, gneiss, and granite, which, I believe, contains both soda and potash. Ores are rare; some tin, iron, chrome, and much manganese ore. I found no fine minerals, no volcanic matters, but one warm spring of pure water.

I have prepared three sections of the Himalayas, from the crest of the mountain chain to the border of the plains, containing physical, geological, meteorological, botanical, and zoological explanations. I did nothing in magnetism and electricity. My map is founded on accurate determinations of the latitude, with which numerous measurements of the angles of direction have been connected. Watches can hardly preserve their regularity in such a country.

On my return, and after I had arranged my collections, I set out, with my good friend Hodgson, to the foot of the mountain chain, where we investigated together the botany and geology of the hot valleys of Terai, kept a meteorogical journal, and sought out evidences of the water terraces and ledges, which I have now traced from the border of the plains up to a height of 16,000 feet. There I found coal, (not workable), and weak traces of the tertiary deposits of the north-west; graphite, iron, and lime, deposited from springs. The characters of the gradual retraction of the waters from the foot of the chain, are beautifully spread out there to a distance of thirty miles from the mountains.

At present, I am preparing for another trip to the snow region.* The Rajah's opposition, and the rainy season will, indeed, oppose obstacles in the way of this new undertaking: but I know the people, and like them; and, if I could find Coolies who would venture to cross the passes, though it were only four of them, I would certainly measure the Thibet Plain, at the foot of the Kanchain; but Chinese vigilance is unconquerable; the people, though good and friendly in all other respects, fear their Rajah and the Chinese; the former sells families as slaves into Bhotan, on the slightest provocation; and I can only obtain independent people from Bhotan, where they fear neither God nor man, nor—Dr. J. D. Hooker, who, nevertheless, would have to share the adventure! I, therefore, cannot undertake anything with such persons. I expect to be absent some months, and hope to carry on a series of meteorological observations high up in the passes, simultaneously with those in Darjeeling and Calcutta.

In the accompanying map I have given the position of the passes approximately; I have sought Lachen and Lachoom, the former of which should run out into the plains of Thibet without descent. Vexatious as it is, I cannot visit it. I have given up all thoughts of Upper Assam.

Thomson has been at the Kurakorum Pass, (placed somewhat too far north in your map), the height of which amounts to about 18,000 feet. He travelled for three days through a plain, which is 17,500 feet high, (the same height as that of Pamir), and, probably, forms a prolongation of the great node of Kuenlin and Bolor. What a glorious approximation your guess at the height of Chumalari is to Waugh's measurement.†

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* In this trip the Doctor and his friend, Dr. Campbell, were both made prisoners; a fact with which our readers are already acquainted, as well as with their release.

† Alluding to Humboldt's assertion that the Chumalari could not be 26,0000 English feet; it is now found to be only 23,929 feet high.

ON CLIMATE.

By E. J. LOWE, Esq., F.R.A.S.

NATURE has so provided for the welfare of the vegetable kingdom, that plants are differently constituted for different climates. As an instance, let us only take the common Wheat of our own country, and compare it with the Indian Corn of tropical climates; the former growing in a temperate region has the ear of corn so constructed that the seed-vessels are placed in rows at a given angle to each other, so as to reflect the heat rays in a manner that nothing is lost, and, besides which, are placed on a slender stem which can be bent in the direction of the source of heat; on the contrary, to the Indian Corn nature has given an innumerable quantity of fibrous threads, to protect the seeds from being burned by the heat rays of a vertical sun, and this not being deemed sufficient, wide blades of grass surround the whole, and so completely are they shielded from the effects of a scorching sun, that the plant may be compared to an umbrella. From this we see the effect of temperature on plants, for if we remove the Wheat of England to where the Indian Corn grows, we receive no produce; on the other hand, when we plant Indian Corn here, how seldom are we enabled to ripen the seed. Plants are also constructed in a peculiar manner with respect to the amount of moisture which they are likely to receive; the aquatic plants, always having a sufficient supply of water, are furnished with leaves more or less convex, which speedily shoot off the falling rain, whilst those growing in rocky places and on mountain-ridges, where but little moisture comes, have them concave, so that the few drops gathered by the passing shower, or from the dews of heaven, may all be conveyed to their roots. In such provisions of Nature we see the wisdom of the Creator on a grand scale.

On nearing the equator we find plants, which in a higher latitude grew on plains or in valleys, now only flourish on mountains; and the nearer we approach the hot countries the higher must the mountains be, if we are to have the same plants growing there. To find a great diversity of plants, we must ascend a mountain, for after having arrived at such an elevation as to have overcome the meteorology of the locality in the immediate neighbourhood, in every yard that we ascend beyond this we find as many fresh species as if we had pursued our search the same number of miles in the direction of the pole; so that were there a mountain situated on the equator, of sufficient elevation and of peculiar construction, around and upon it would grow all the plants contained in the world.

The temperature of a locality is affected by numerous causes, amongst which are the following:—1st, by the nature of its surface, *i. e.* whether land or water; 2nd, by its elevation above the level of the sea; 3rd, by its aspect; 4th, whether sheltered or exposed; 5th, by its soil, the nature and composition of which, especially its colour, and its state of aggregation, have much influence—for on this depends its power of absorbing and reflecting heat and light, and of retaining or parting with humidity; 6th, by its nearness to seas, or by its distance from them; 7th, by the predominance of certain winds; and 8th, by the frequency of clouds, fog, &c.

In ascertaining the temperature of a locality, we must not be content when we have learned the mean yearly heat, this will benefit us but little, for Stockholm and Quebec have a nearly similar mean temperature, yet the winter in Quebec is 11¼ degrees colder, and the summer 6 degrees warmer than that of Stockholm. Again, the mean yearly temperature of Philadelphia and St. Malo are the same, yet the coldest month of the former is 7 degrees below the freezing point, whilst that of the latter is 10 degrees above it. To succeed in the most perfect manner in the cultivation of foreign plants, Nature must be copied as closely as possible; if we find the plants to be treated with have come from a locality whose summer heat is 80 degrees and winter heat 40 degrees, we must treat them in the same manner; and if we find the temperature, on the average, in the day time rises to 70 degrees, and at night falls to 30 degrees, why ought not we to imitate this also, instead of piling on the embers in the evening as if we thought, for instance, our plant from Pekin (whose hottest month is 84½) could not survive a temperature at a freezing point, whilst, had we suffered it to remain in its own country, it would have braved a month's cold 7½ degrees below the freezing point?

It would be a difficult matter to make any alterations in the pressure of the atmosphere; luckily the same mean pressure at the level of the sea is maintained all over the earth, and the only difference between the tropical pressure and that of our own country is, that in the former we have only a range of a third of an inch in the barometer, whilst in the latter we have three inches. According to Dr. Prout, in 30 inches of pressure (which is slightly above the mean), 23·36 inches is azotic gas, 6·18 inches oxygen gas, 0·44 inch aqueous vapour, and 0·2 inch carbonic acid gas; therefore, the three-inch range in the barometer is not due to the rain in the atmosphere; for were we to have the whole amount of moisture annihilated, it would not make a difference of more than half an inch in the pressure of the atmosphere.

IXORA GRIFFITHII.

Nat. Ord., RUBIACEÆ.

GENERIC CHARACTER.—Ixora, D. C.—*Calyx* with an ovate tube; limb small, four-toothed. *Corolla* salver-shaped; tube slender, terete, longer than the lobes; limb four-parted, patent. *Anthers* four, sessile in the throat of the corolla. *Style* equal to the tube of the corolla, or a little longer (yet shorter than the coralline lobes), bifid at the apex; lobes of the stigma divergent, or revolute. *Berry* drupaceous, crowned by the persistent calyx, sub-globose, two-celled. *Cells* of the fruit papery, flat or concave within, gibbous on the back, one-seeded. *Albumen* cartilaginous. *Embryo* dorsal, erect, incurved; cotyledons foliaceous; radicle long.

IXORA GRIFFITHII,—*Hooker*. Griffith's Ixora.—Glabrous; leaves large, oblong-ovate, acuminate, acute at the base, shortly petiolate, reticularly veined; stipules short, broad, acuminate; cyme full, dense, and compound; calyx small, short obtusely four-toothed; tube of the corolla elongated and slender; lobes of the limb round, very obtuse, patent; anthers linear-subulate, spreading horizontally; style a little exserted, stigmatic branches very short.

SYNONYMY.—Ixora Griffithii, *Hooker in Bot. Mag.* 4325. I. hydrangeæformis *of gardens*.

DESCRIPTION.—A large branching shrub, the branches terete, rich brown. Leaves large, oblong, ovate, acuminate, somewhat cuneate at the base, tapering into a short stout petiole, penninerved, with numerous transverse veinlets, glabrous, as is every part of the plant. Stipules broad, short, acute. Cyme large, broad, nearly flat at the top, compound with a great number of salmon coloured (or sometimes yellow and scarlet) flowers, with a pair of leafy bracts at its base. Calyx very small, with four short blunt teeth. Corolla salver-shaped, salmon colour (or at first orange-yellow, then red-orange); the tube long, slender; the limb of four rotundate, very obtuse, spreading lobes. Anthers sessile, inserted at the mouth of the tube, and lying horizontally between the lobes. Style a little longer than the tube; stigma bifid.

HISTORY, &c.—Discovered by Mr. Griffith at Mergui, and first introduced by Mr. Low from Singapore. It was disposed of at first under the unpublished name of I. hydrangeæformis, by which it is in part known in gardens; but the description given by Sir W. J. Hooker is under the name here adopted.—H.

For an opportunity of figuring this beautiful plant, we are indebted to Messrs. Lucombe, Pince, and Co., of Exeter, who kindly sent us a very fine specimen in April last, and from which the annexed vignette was taken.

CULTURE.—This splendid species, like all the rest of the family, delights in an atmosphere produced by fermenting materials, such as a dung frame, or pit. When procurable, those short stubby pieces, generally found upon large plants when they have done blooming, are the best to propagate from, as they root freely, and also produce abundance of branches. Take the cuttings when the wood is tolerably ripe, and having cut them into slips of about three inches long, place them immediately in small pots, in sandy turfy soil, and plunge the pots in a brisk bottom heat. If the atmosphere is not very moist it will be necessary to cover the cuttings for a time with a bell glass, but if the atmosphere is close no such protection will be necessary. When the cuttings are rooted pot them off separately, using rich turfy peat and sand, and plunge them again in a brisk bottom heat. If sufficient heat can be commanded, it is a matter of little importance at what time the cuttings are put in; but, when a preference can be had, of course spring is the best time. If your object is to grow large specimens, select the best plants in February, and having stopped the shoots, to make the plants bushy, pot them directly they have made shoots an inch long, using rich turfy peat and gritty sand, with some small potsherds and broken charcoal. Maintain a brisk bottom heat of not less than 80 degrees, and an atmospheric temperature of from 65 to 75, with abundance of moisture, and a free circulation of air. As the plants progress in growth peg the shoots out horizontally, to form a good foundation, and water occasionally with weak manure water. When the plants require it give a second shift, and stop rude growth, so as to form compact specimens. If it is wished to bloom the plants the first season they must not be grown too late in the autumn, but air must be admitted freely, so as to ripen the wood, and set the flower-buds before winter commences. Pursue the same treatment in the second year, but keep the plants in a comparatively dry atmosphere through the winter. Guard against insects, and success is certain.—A.

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NOTES ON DECORATIVE GARDENING.

BY H. NOEL HUMPHREYS, ESQ.

ARTIFICIAL WATER IN GARDENESQUE SCENERY, FOR GROWING AQUATIC PLANTS.

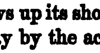
WATER, in a state of repose, produces the best effect when it is introduced in the lower portions of undulating grounds, such seeming the more *natural* position; and the best *artificial* effects, though they must be arbitrary to a certain extent, are always most successful when based upon the laws of natural phenomena. Thus, a series of fish-ponds rendered decorative by stone dressings, &c., or shallow canals for the cultivation of aquatic plants in the open air, which may be made very ornamental, as shown in our illustrations, are best suited to the lower levels of an ornamental garden, where also the water plants, some of them of delicate constitution, are more sheltered from the cutting winds of our variable and sometimes bleak climate. In such a situation, for instance, the common Arum (Calla, or Richardia), a native of St. Helena and the Cape, where it grows in the rich soil at the edges of rivers, may be cultivated with success; the roots being secured in concavities formed of *cement*, of which the bed of the canal is formed, and which should be about a foot below the surface of the water. Managed in this manner, this plant, rearing its head high above the water, might be made to form a very picturesque contrast to the Water Lily, which rests its graceful head upon the surface, as Mrs. Hemans has beautifully said:—

> "A sculpture-like, and stately river queen."

The supply for a canal of this description may be derived from the water of fountains occupying the higher level of the gardens, whence, after having performed its *tour de force* as a jet twenty feet high, or formed a temple of moving crystal, and many other devices, it may be made to descend in properly prepared channels to the lower levels of the garden, to feed canals of this description, constructed for the purpose of growing ornamental aquatic plants, particularly such as require the stimulant of running water.

The annexed engraving (No. 1) is a design for a shallow canal or tank of this description. At the upper end the water enters, as shown, from a conduit, falling in a very thin sheet over a lead form contrived expressly to spread it as much as possible, and thus make an exceedingly small supply produce the effect of a continual cascade. In a similar manner it falls at the lower end into a basin, from which an invisible outlet leads to a drain or conduit to carry the waste away, or to conduct it to some reserve tank for common gardening purposes. On each side of the canal is a shallower channel, contrived expressly for the growth of plants requiring more careful treatment. The receptacles for the soil, sufficiently massive to remain steadily at the bottom of the channel, might be very neatly contrived in the following manner:—A is a hollow receptacle, and B is a lid pierced with holes as marked. The plant being placed with earth in the receptacle A, the cement lid B, which fits pretty tightly, is fixed on, and the plant throws up its shoots through the apertures prepared for that purpose. By this means the soil is not washed away by the action of the water, nor is the water rendered muddy on the slightest disturbance, as would be the case were not the soil about the roots of the plants secured in this or some other manner. The water in a canal, the sides and bed of which should be composed of Portland cement, might by these precautions be kept continually limpid, which the gentle supply of fresh water would tend to ensure. The addition of gold and silver fish, in water as clear as this would be, would form a great addition to the general effect, furnishing colour in rapid and fantastic motion, as a strong contrast to the *still* colours of the plants.

A



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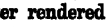
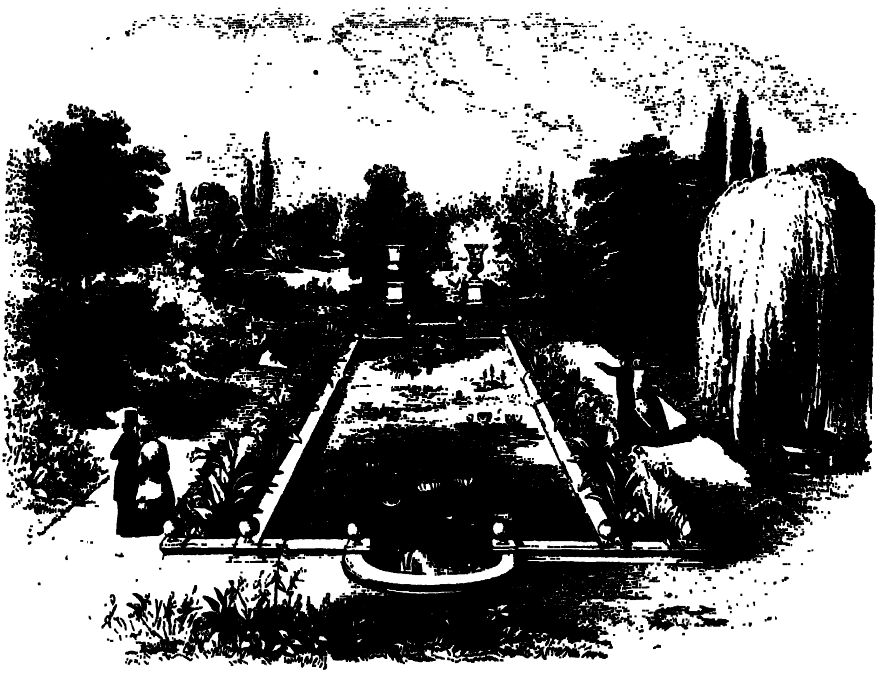


A canal of geometric figure of this description should have stone or cement dressings of an architec-

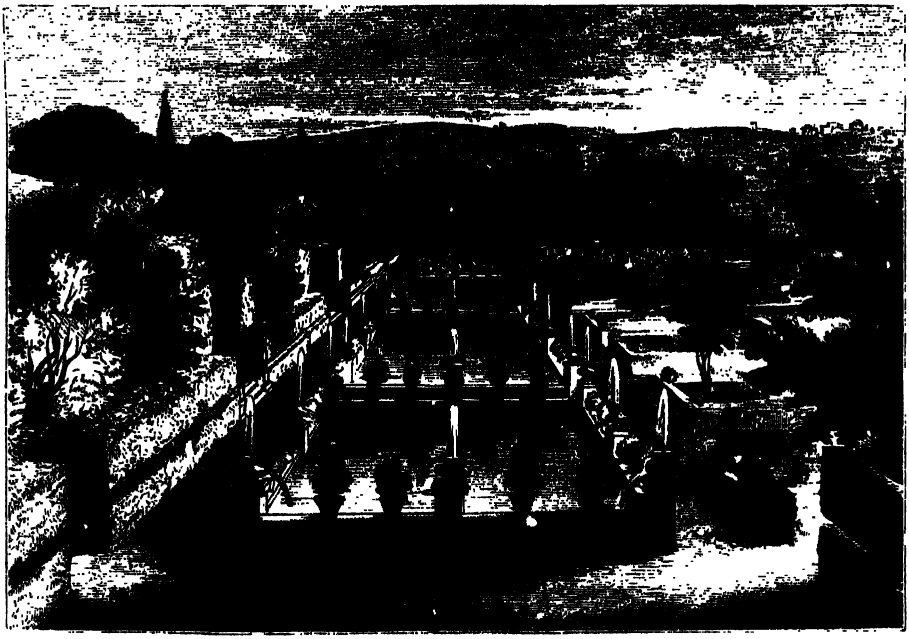


1. GEOMETRIC CANAL OR TANK FOR WATER PLANTS.

tural character, as shown in the engraving, which should be surrounded by a broad gravel path of similar form, approached by a straight walk of some length, to prepare the eye for the regular forms of the canal and its appendages; and the entrance to this aquatic parterre might, to aid its semi-architectural character, be marked by two large vases on pedestals; a few flower-beds, and some masses of shrubs, might be the means of partially concealing these symmetrical features from the rest of the pleasure-grounds, if rendered necessary, on account of their distinct character.

The plants I have shown in the central or deep part of the canal are simply our native Water Crowfoot, the Marsh Marygold, and the white and yellow Water Lilies, &c., to which might be added the Frog-bit, the floating Plantain, the Water Soldier, and many hardy exotics. In the shallow channel at the sides, I have placed the common yellow Iris, and our handsome native plants, the flowering Rush, and the Arrow-head, with the greater and lesser Water Plantain; to these I have added the elegant Cape plant already mentioned, and commonly known among cultivators of window flowers as the "Arum;" which, grown in water in this manner, attains to much greater size and perfection than by ordinary pot culture.

In order to form a canal or tank of this description for the purpose of growing aquatic plants, the first requisite is a supply of water. A small brook or spring, in any part of the grounds, will be sufficient, which may be cheaply conducted beneath the surface, to any spot required, if not higher than the brook or spring itself, by means of a leaden pipe, or gutta percha tube, which latter is now being used for such purposes. A tolerably level spot in the lower portion of the grounds should be selected, as convertible at the least expense to the purpose required. The excavation must now be dug, of the extent determined on—the one shown in the design is supposed to be about 24 feet wide by 48 feet long, but a canal of half these dimensions would form a very pleasing object in a place of suitable proportions. The excavation should be about 2 feet 4 inches deep in the central compartment, and 1 foot 4 inches in the side compartments. When the bottom and sides have been made as smooth as can be accomplished with the spade, the masonry may be commenced, which is of so simple a character that any country bricklayer may execute it under the directions of an intelligent gardener. First, let a layer of flat tiles be placed against the sides, and laid in Portland cement, which should be done in dry weather, when the soil is not too moist, or the cement will not set well; a second layer

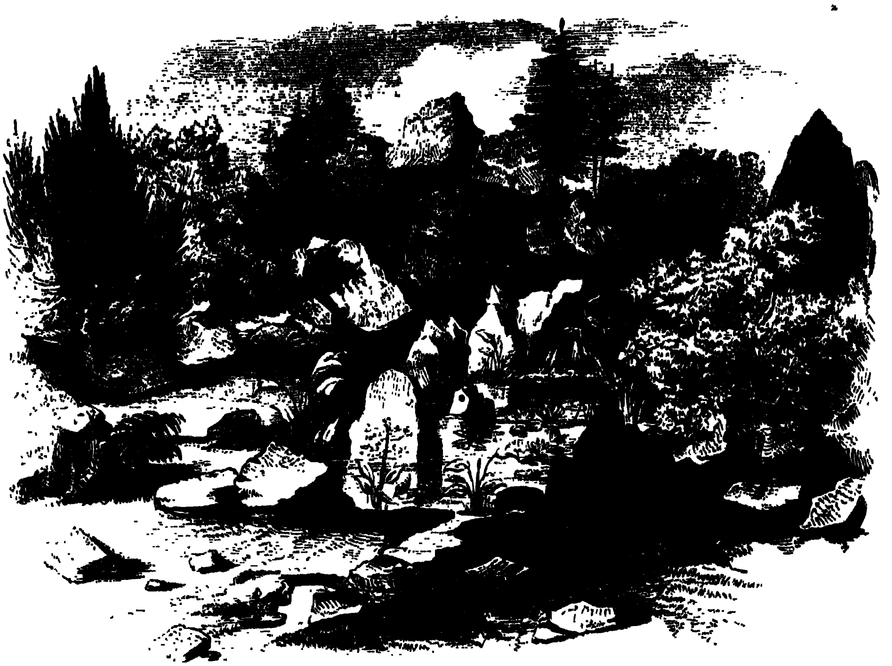


2. ARCHITECTURAL FISH POND AT THE VILLA STRADA, NEAR ROME.

of tiles, with cement between the layers, will make a more complete job, but one layer is sufficient; the bottom must then be covered with tiles laid in cement in a similar manner, and the whole left till perfectly dry; the ornamental moulding may be formed, in bulk, by a single row of bricks, which, being covered with a sufficient coating of cement, may have moulding lines run along it with a moulding tool, in the usual manner known to any plasterer. The parts designed for the entrance and exit of the water may be formed in the same manner as the cement coping, and with but little more complication. The pipe conveying the water from the spring will be conducted to a small reservoir immediately behind the point at which it enters the tank, or to a leaden shape made to spread it into a thin semicircular sheet, in which form it will fall into the tank, as above described; the surplus water at the other end need only be conveyed away in a common brick drain; but, if desirable not to waste any of it, the drain should be lined with cement. Ornamental balls, vases, or other decorations, required, may be procured at little cost at any cement works, and can be easily added in the way of embellishment.

The tank being complete in all its parts, and the cement perfectly dry and hard, the aquatic plants may be placed in the vessels shown at A and B, which are intended to be rather more massive, and more broad in proportion to the height, than common flower pots, in order to keep them steady and secure at the bottom of the water. These pots, with their plants and soil secured by the perforated lids, may now be placed in the desired positions about the bottom of the tank; the Water Lilies, both white and yellow, and other plants, which grow commonly from a considerable depth, in the central compartment, and the Arums, and different species of Water Iris, &c., &c., in the shallower compartments at the sides. The best time for making a tank of this description is either at the end of March or late in September; in the first place, to secure the cement from the effects of frost, which, before it is thoroughly dry, would cause it to become rotten and crumble; and, in the second place, in order to place the plants in their new position after they have finished their summer growth, and are about to enter into their natural period of repose, or just before the spring growth commences. If it is found inconvenient to get the vessels for the plants made in the form suggested, ordinary flower-pots, with moderately-sized stones or pieces of tile placed on the surface of the soil to secure it, will answer the purpose nearly as well.

The next illustration (2) shows the architectural treatment of a fish pond or pescheria in the gardens of an Italian villa. It exists at the Villa Strada, in the Strada Nuova, near Rome. The architectural



3. PICTURESQUE OR ROCKY TANK FOR WATER PLANTS.

features are perhaps over done, but are an excellent example of the highest and most laborious style to which architectural gardening has been carried in Italy.

The engraving No. 3 exhibits a canal supplied in a similar manner, and for a similar purpose, as in No. 1, but which is treated in a manner precisely the opposite of the symmetrical or architectural. The picturesque, as it is termed, has been the effect aimed at, in the form of a rocky valley, which it is intended should be entirely screened from the rest of the grounds by means of well disposed shrubberies, leaving only an approach through a tunnel of rock. A completely sequestered spot of such totally distinct character would form a very pleasing contrast to the more regular portion of the grounds, and the aquatic plants, which may be the same as those in the engraving No. 1, would, in a situation so sheltered, thrive with great luxuriance. In the interstices of the surrounding rocks, Broom and double-flowering Furze should be planted, with hardy Cistuses, and a variety of Ferns; and so completed, the scene would be very original in its general effect.

A tank of rocky character must be prepared exactly in the same way as the one previously described as far as its foundations, supply of water, &c., are concerned. The form, however, must of course be irregular, the rocky effect of the sides being produced by bricks irregularly placed, and roughly covered with cement, as also the opening for letting in the water. The detached pieces of rock should, if possible, be rough pieces of real stone, collected in the neighbourhood; which in many places, such as the red sandstone districts, is easily accomplished, such pieces, in picturesque forms, being very abundant. But where real stone is not available, such masses may be formed by bricks roughly covered with cement, and will produce a very good effect, if the eye of a tasteful director superintends the formation of the outline and position. I recommend this latter mode of producing rock-work as very superior to a collection of heterogeneous materials, which always produces a petty, broken, and patchy effect, while the general similarity of colour of the cement-work gives continuity and grandeur to the design, and the forms may with these materials be made large and majestic in their character, to any extent that the nature of the design admits of.

In the rocky tank, I have supposed the waste water to escape in the form of a small open stream among pieces of rock, which, with the addition of a few well-selected pebbles in its channel, would produce a very pleasing feature in such a scene.

HORTICULTURAL SOCIETY'S JULY EXHIBITION.

IF there is one thing more than another to which the late summer metropolitan exhibitions bear evidence, it is that the process of retarding in Horticultural matters is as important in its way, and nearly as well understood, as that of accelerating the development of growth and bloom. To the greater degree than formerly to which this process is now carried, is partly attributable the freshness and vigour evident in the objects of a July exhibition, notwithstanding the battle that has to be fought against the heat and glare of summer. A good example of this occurred on the 13th of July in the garden of the Horticultural Society, where was provided for the enjoyment of the visitors, a splendid assemblage of gay vegetable forms, added to the attractions of the Duke of Devonshire's pleasure grounds and flower garden. We have said that the freshness of the July exhibitions of the present day is partly attributable to the cultural process just referred to; it is only fair to add that it is also in part attributable to the greater variety of plants which are grown to an "exhibition" state of perfectness, and to the especial selection of such kinds as best endure the heat of summer—in fact, exhibitions like other matters, prove to have been benefited by experience.

IXORA JAVANICA: exhibited by Mrs. Lawrence.

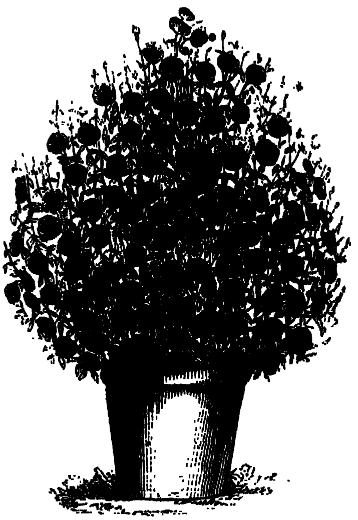
As a whole, the exhibition under notice was quite up to the mark, though certainly not beyond what we have lately seen elsewhere. The miscellaneous collections were good—generally very good; the Orchids less fine and numerous than usual, but still abundant and beautiful; Heaths showing stereotyped perfection of growth; Roses gay as summer should produce them; Pelargoniums less bulky than before, but in some instances equally well bloomed; Carnations and Picotees attractive as they always are; and Fruit—that great test of superior cultivation—abundant, and for the most part indicating good growth, and produced in a well-ripened condition. The Royal Water Lily, sent from Syon, again occupied the first position in point of interest, and probably few, if any, of the assembled visitors failed to do homage to the Queen of Flowers.

Three large collections of stove and greenhouse plants were staged, the exhibitors being Mr. Cole, gardener to H. Colyer, Esq., Mr. May, gardener to Mrs. Lawrence, and Messrs. Fraser; the collections of the two former were about balanced in respect to merit, and an equal award would, we think, have done no injustice on either side. Mrs. Lawrence had fine plants of Stephanotis, of three species of Allamanda, and of Clerodendron paniculatum; an Ixora javanica of gorgeous beauty, with plants of I. coccinea and crocata, in rather an inferior condition as to freshness; a large Tristania, too natural in its unrestrained growth; and a small gay bush of Relhania speciosa, the nursery name of a brilliant yellow shrubby composite, of the distinctness of which from the old forgotten R. squarrosa, we entertain some doubt. This collection was spoiled by the really beautiful, but there ineffective Sollya linearis, placed by the side of a large, dull looking Phœnocoma. Mr. Cole's collection, which was more uniform in growth, contained three excellent Allamandas—cathartica, Schottii, and grandiflora; Dipladenia crassinoda, one of the gems of the exhibition; D. splendens; a brilliant Kalosanthes; Clerodendron Kæmpferi; and two very fine Ericas, eximia and ampullacea, scarcely enough in bloom. Messrs. Fraser had Sollya linearis, Rhyncospermum jasminoides, Dipladenia crassinoda, and Tristania neriifolia, in an attractive form. Two fine and nearly matched collections of fifteen came from Mr. Green, gardener to Sir E. Antrobus, and Mr. Carson, gardener to W. F. G. Farmer, Esq., the former of whom had a splendid bush of Pleroma elegans, and a very fine Lisianthus Russellianus, most conspicuous; while the latter had an admirably bloomed Æschynanthus Lobbianus, and Lemonia spectabilis in a state rarely seen, with Medinilla speciosa, and other good plants. The most prominent plants in the collections of ten were, a large Kalosanthes coccinea, and a good Allamanda cathartica, from

Mr. Pamplin; good small plants of Phœnocoma, and Ixora coccinea, from Mr. Croxford; Schubertia graveolens, and Struthiola ovata, from Mr. Speed; and Euphorbia splendens from Mr. Stanley. Mr. Bruce had a good Astelma eximium; and Mr. Watson, of Norwood, showed Plumbago Larpentæ (Valoradia plumbaginoides), but not in a state to raise it in public estimation.

Specimen greenhouse and stove plants were very good, but we regret to have noticed in this department some strange infatuation in the distribution of the prizes. Undoubtedly the finest of them was an unparalleled plant of Erica ferruginea from Mr. Epps of Maidstone; this, besides being very large and well formed, was finely bloomed and in full health. Then as an example of culture, Mr. Green's Lisianthus Russellianus stood very prominent; of this plant we hope shortly to present our readers with a portrait. Mr. May's Ixora javanica was also one of the best, and was very fine, though its deepened red-colour made it now less attractive than as it was shown at the Regents Park. Messrs. Fraser had a splendid Kalosanthes, very large, and brilliantly coloured. Other good plants were a large Stephanotis, and an equally fine Sollya linearis, from Mr. May; Dipladenia splendens, and a Kalosanthes from Mr. Cole; Erica retorta amabilis from Messrs. Rollisson; Curcuma cordata, and C. Roscoeana from Mr. Ivison; Leschenaultia formosa from Mr. Green; and a small, but very well managed Erica Parmentieriana rosea from Mr. Dennett.

Of new plants there were Ixora salicifolia, a fine thing, with salmon red flowers; and Rhododendron javanicum, of nearly the same colour, still finer, from Messrs. Veitch of Exeter. Mr. Cole sent Echites Franciscea, a stove climber with small pale evanescent flowers, apparently of little value. Mr. Ivison had a Cattleya in the way of Mossiæ. Messrs. Lane sent a pale yellow Acineta with a spotted lip. Mr. Salter had Griffinia Liboniana. Messrs. Rollisson sent Thyrsacanthus bracteolatus and Luxembergia ciliosa, nicely bloomed. Mr. Glendinning had a plant of the purple Achimenes Tugwelliana. Mr. Gerrie had one of the brown-flowered Lycastes. In the orchideous collection from Mrs. Lawrence, was an Odontoglossum in the way of grandis, but much less handsome, having a smaller lip, and wanting the rich brown stains; together with a beautiful little Angræcum with the narrow segments of the wholly white flower, reflexed.


PLEROMA ELEGANS: exhibited by Sir E. Antrobus.

Orchids in collections of twenty were shown by Mr. Mylam, gardener to S. Rucker, Esq., and by Mr. Williams, gardener to C. B. Warner, Esq. Mr. Mylam had Vanda Batemanni, Aerides quinquevulnerum, Sobralia macrantha, Cypripedium barbatum, Coryanthes maculata, and Odontoglossum hastilabium, attracting most notice; Mr. Williams had Phaius albus, and Aerides roseum, and affine, in very good condition. A beautiful set of fifteen was sent by Messrs. Rollisson, who had Cattleya crispa, white with a deep purple crisped lip, bearing ten scapes, some of them with seven flowers; this was the finest Orchid in the exhibition; with it were Stanhopea Devoniana and tigrina, with Miltonia spectabilis, Coryanthes macrantha, and a Sobralia called liliastrum alba, the flowers of which are white with a fringed lip, deep orange in the centre. Other Orchids were sent by Mr. Dobson, Mr. Blake, gardener to J. H. Schroder, Esq., Messrs. Carson, Green, Woolley, Gerrie, and Kinghorn.

The principal groups of large Heaths came from Mr. Smith, gardener to W. Quilter, Esq., Mr. Leach, gardener to S. Rucker, Esq., Mr. Cole, Messrs. Epps, Rollisson, and Fairbairn. The same parties (Mr. Leach excepted) sent collections of small plants, neat and full of bloom, a very interesting feature in the display of these beautiful plants. Several sets of Helichrysums were produced. Some good collections of Achimenes were present, especially those from Mr. Dobson and Mr. Ivison; venusta and picta were the most beautiful kinds. One interesting collection of new Hardy Evergreens came from Mr. Glendinning, who had Ceanothus rigidus, papillosus, dentatus, and cuneatus; Cerasus ilicifolia, Myrica californica, Berberis Leschenaultii, Rhamnus californicus, Laurus regalis, and a Californian Arbutus. Mr. Glendinning also had a collection of Statices—a set of plants we are surprised to see so little competition in. Ferns came from Mr. Williams and Mr. Woolley; and Mr. Salter, of Hammersmith, had some umbrella-trained Fuchsias, rather interesting compared with the weedy things now generally exhibited as specimens of Fuchsia cultivation.

The best Pelargoniums came from Mr. Parker, Mr. Robinson, and Mr. Staines, the other exhibitors being Messrs. Cock, Dobson, Bragg, and Gaines. Topping's Brilliant, a large light scarlet variety was very effective; as also was Pearl. Scarlets were shown by R. Moseley, Esq.; Fancies by Messrs. Ambrose, Staines, Moseley, and Gaines; Capes by Mr. Stanley and Mr. Staines. Mr. Gaines had a plant of his Cerise Unique, one of a distinct class of variegated scarlets, having the centre of the leaves pale green, the flowers are very light scarlet and well formed. The Rose showers were numerous, the dealers included Messrs Lane, Paul, Francis, Epps, Rowland, Curtis, Gregory, Spriggins; the gardeners who exhibited were Ayres, George, Terry, Slowe, Tivey, Foster, Ingram, and Harman. Geant de Batailles was shown profusely and very brilliant; as was Dupetit Thouars, nearly as rich in colour; Baronne Prevost and La Reine, of the paler sorts, were very fine; Souvenir de la Malmaison was also shown in quantity, so was the tea-scented Devoniensis, both fine light roses. Several good stands of Carnations and Picotees were communicated by Messrs. Norman, Ward, Willmer, Bragg, Edwards, Ellis, and Newhall.

Mr. Ivison sent tropical fruits of uncommon kinds, consisting of a ripe Papaw, full-grown Vanilla, Granadilla, the snake Cucumber, and the Nutmeg just bursting its husk. Pine-apples, of which there were twenty-eight in number, were not remarkable for size or beauty. The best Providence weighing 9lb 13½oz came from Mr. Spencer, gardener to the Marquis of Lansdowne; Mr. Jones, gardener to Sir J. Guest, had a Queen weighing 5lb. 9¼oz.; and Mr. Drummond, gardener to C. H. Leigh, Esq., Pont-y-pool, had one, not ripe, weighing 5lb. 14oz., along with several others over 5lbs. each. The best looking Queen Pine, in a ripe state came from Mr. Higgs, gardener to J. H. Barchard, Esq., and was stated to weigh 4lb. 12oz. Melons were very numerous, including several of the Beechwood, Bromham Hall, and Trentham hybrid varieties. The Grapes were also numerous; we noticed the following as the finest samples: Muscats, from Messrs. Woodham Death, of Netteswell; Taylor, gardener to J. Coster, Esq.; Fleming, gardener to the Duke of Sutherland—small but high-coloured; Rust, gardener to J. M'Laren, Esq.; Kemp, gardener to Mrs. Grillion; and Thomson, gardener at Wrotham Park—fine bunches: Cannon Halls, Mr. Boyd, gardener to Viscount Dillon, Dytchley Park, Oxon: Hamburghs, Messrs. Holmes, gardener to S. Garrard, Esq., Putney—the best; Taylor; Smith, gardener to S. Ricardo, Esq., Sunning Hill; Foggo, gardener to the Marquis of Abercorn; Haywood, gardener to G. Goodman, Esq., Roundhay; Harrison, Oatlands; Davis of Oakhill; Gerrie, gardener to Sir J. Cathcart—not coloured: Black Princes, Mr. Lushey, gardener to J. Hill, Esq., Streatham: Dutch Sweetwater, Messrs. Riddell, gardener to F. Ashby, Esq., Staines; Chapman of South Lambeth: West St. Peter's, Mr. Turnbull, gardener to the Duke of Marlborough: Royal Muscadine, Messrs. Smith, gardener to A. Anderson, Esq, Streatham; Williams, gardener to C. B. Warner, Esq., Hoddesdon. The heaviest single bunch of Hamburghs, weighing 3lbs. 1oz., was from Mr. Henderson, gardener to Sir G. Beaumont—not coloured; of Muscats from Mr. Thomson; of Syrian, 3lbs. 10oz., from Mr. Smith, gardener to S. Ricardo. Peaches: very fine Violet Hatives, came from Mr. Ingram, gardener to her Majesty, and from Mr. Snow, gardener to Earl De Grey; Noblesse from Mr. Spencer; Royal George, from Messrs. Foggo, Spencer, and Henderson; Galande, from Mr. Parker, gardener to J. H. Oughton, Esq. Nectarines: fine Elruge, came from Messrs. Fleming, Turnbull, Parker, Davis; Violette Hative, from Mr. Parker. Cherries: fine Circassians, from Messrs. Gainsford, of Brentford; Whiting, gardener to H. T. Hope, Esq.; and Myers, sen., of Brentford; Black Tartarians from Mr. Snow; Bigarreaus, from Messrs. Whiting and Snow. A good dish of Brown Turkey Figs was sent by Mr. Gerrie. Of Strawberries, among the numerous samples sent, the following were the most remarkable:—British Queens, from Messrs. Lydiard of Bath, G. Elliot, gardener to J. B. Boothby, Esq., and Beach of Hounslow: Eleanor, from Mr. Lydiard: Mammoth, a very large comb-shaped fruit, from Mr. Lydiard: Prince Arthur, a new sort of some merit, from Mr. Wilmot of Isleworth: Comte de Paris, from Mr. Busby: Bicton Seedling, from Mr. Munro, gardener to Mrs. Oddie: Kitley's Goliah, from Mr. Kitley, of Bath. Mr. Wilmot had also some pots of his Prince Arthur Strawberry, which proves a free bearer, of dwarf habit, the fruit of moderate size, generally oval in form, good flavoured, and, which is its best quality, so firm as to bear carriage or even rough handling without injury. A beautiful small, but well swelled and coloured bunch of Black Hamburgh Grapes was sent by Mr. Wilmot; they were from the second crop—a fair one—of this season, the first having ripened in February last. Some good Pot Vines were sent by Mr. Smith of Sunning Hill.

Thus closes the series of leading Metropolitan exhibitions for the present season; and, we think, in quitting the subject for the present, we may truly say that in no previous year have the objects of exhibition been so uniformly meritorious throughout, as they have been in the year 1850.—M.

ROUPELLIA GRATA.

Nat. Order, APOCYNACEÆ.

GENERIC CHARACTER.—Roupellia, *Bentham*.—*Calyx* five-parted, the lobes spathulate, suddenly acuminated, keeled above, fleshy below, imbricated in æstivation. *Corolla* with a funnel-shaped tube and five orbicular, spreading lobes, convolute towards the left in æstivation; the throat bearing ten horn-like teeth, connivent in pairs opposite the lobes of the limb. *Stamens* five, the *filaments* adherent half-way up the tube, projecting as ridges, free for a short space; *anthers* acutely sagittate, the divergent basal lobes without pollen; summits elongated, attenuated, without pollen, included. *Ovary* two-celled, with the inrolled placentiferous margins of the carpels presenting two scroll-like edges on the cross section; *ovules* minute, very numerous, orthotropous?; *style* simple; *stigma* capitate, with a circular stigmatic surface, and five short, blunt terminal teeth.

ROUPELLIA GRATA, *Wallich* and *Hooker*. Cream-fruit.—A half-climbing, stout shrub, with opposite, shortly-stalked, oblong-elliptical, shortly-acuminated leaves, wedge-shaped at the base, coriaceous; the petioles a little dilated at the base, joined by a transverse line, with small, acute stipulaceous glands within; cymes terminal, sessile, densely 6-8 flowered, almost umbellate; bracts ovate-lanceolate, acute, acuminate, keeled at the back; pedicels longer than the bracts, shorter than the calyx.

SYNONYMY.—Roupellia grata, *Wallich* and *Hooker* in *Bot. Mag.*, t. 4466; Strophanthus Stanleyanus *of gardens*.

DESCRIPTION.—A glabrous half-climbing shrub, with opposite, full-green, coriaceous leaves, on short stalks, oblong-elliptical, four to six inches long, shortly acuminate above, acute at the base; petioles a little dilated at the base and bearing a pair of stipule-like glands within. Cymes terminal, sessile, composed of 6-8 closely crowded flowers, arranged somewhat umbellately. Bracts ovate-lanceolate, acute, keeled at the back. Pedicels longer than the bracts, shorter than the calyx. Lobes of the calyx fleshy. Corolla large, fleshy, white, tinged with pale rose; tube an inch and a-half long, funnel-shaped, glabrous inside and out; lobes of the limb orbicular or broadly ovate, spreading, somewhat crisped at the margins; the throat crowned by ten erect linear-lanceolate teeth of a bright rose colour, rather inclined together in pairs opposite each lobe. Stamens becoming free at the commencement of the enlarged part of the tube of the corolla; filaments free for a short space, slightly papillose; the points of the arrow-shaped anthers very acute, equalling or a little surpassing the throat of the corolla; the basal lobes not much diverging; only the middle portion of the anthers polleniferous. Ovary inserted in a thickish disc, scarcely produced into a nectary.

HISTORY.—A native of Sierra Leone, where it was first noticed by Afzelius, and was mentioned by Mr. Brown in the Appendix to *Tuckey's Voyage* under the name of "Cream-fruit." When first exhibited in this country it was called Strophanthus Stanleyanus, but it was subsequently figured and described under the present name in the *Botanical Magazine* (t. 4466). Our figure is from a plant exhibited in the garden of the Royal Botanic Society in June 1850, by H. Colyer, Esq., of Dartford.—H.

The flowers which are at first white with rose-coloured teeth, change after being a few days expanded to cream colour, with the teeth reddish brown. It has been for some six or eight years cultivated in the gardens of this country, and appears to have been introduced by Mr. Whitfield. The flowers have a very agreeable fragrance.

CULTURE.—Notwithstanding what has been said by a contemporary to the contrary, we have no doubt, under proper management, this will be found one of the finest stove climbers ever introduced, and also an excellent pot plant. Being a native of tropical Africa the secret of its management, is vigorous growth first, and a thorough maturation of the wood afterwards; for unless the wood is thoroughly matured it is quite certain it will never produce flowers.

The most likely method of procedure to insure success is the following:—Take a young strong plant early in the season, say the end of February, and if the roots are fresh and healthy, pot it immediately, using a compost consisting of good fibrous loam, peat, and leaf mould in proportions of one of the latter to two of the former, and secure the porosity of the mass by a liberal use of sand, potsherds, and charcoal. When the plants are potted, plunge the pots at once in a bottom heat of seventy-five degrees and increase it to eighty-five as the days increase in length and the plants get into full vigour. During the growing season up to the end of July, pot the plants as frequently as they require it, taking care that they sustain no check, and, to promote full vigour, water twice a week with liquid manure. The atmospheric temperature should range from 65 to 90 degrees, with the atmosphere saturated with moisture, and all the air that can be given consistently with the maintainence of the requisite heat. Where it can be had, the heat of fermenting materials is the best for stove plants of all kinds, and in it they will not only grow faster, but may be kept more free from insects than under any other treatment. Towards August, when the plants have completed their summer's growth they must be fully exposed to the sun, admitting air very freely, but still maintaining a high temperature. As the wood gets thoroughly matured some of the leaves will fall off; but never mind that, as it shows the object you are aiming at is attained. As the wood ripens, decrease the supply of water, and through the winter it must be supplied very sparingly, and a temperature of sixty degrees will be quite sufficient to keep the plants in health. The Roupellia rarely flowers the first season, and if you get a strong plant, take care in the second year to get short stubby well-ripened wood, from which the flowers will be produced. Mr. Cole, the successful gardener to Mr. Colyer, to whom we are indebted for an opportunity of figuring the plant, says, he has no fear but that in another season he "will bloom it as freely as an Ixora;" and if so, it will certainly be one of our finest exhibition plants.—A.

The generic name Roupellia has been applied in honour of the family of Roupell, several members of which are active promoters of botany.

New and Rare Plants.

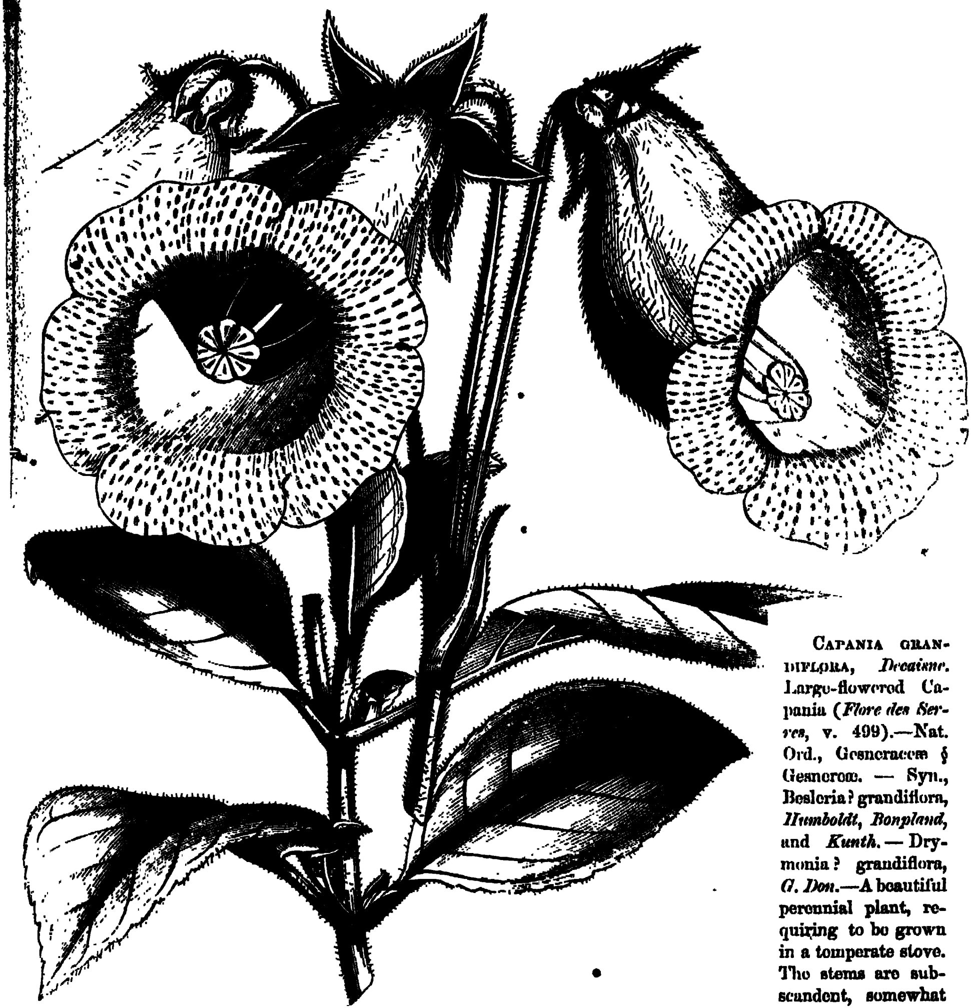
Maranta ornata, *Linden*. Ornate Maranta (*Flore des Serres*, v., 413 and 414).—Nat. Ord., Marantaceæ.—A very conspicuous and elegant-leaved stove herb, of which the proper generic name remains doubtful until flowers have been examined. The leaves are ovate-lanceolate, of a rich deep green, tinged on the under side as well as on the stems, with a rich stain of purple. There are two forms of this plant:—1, *albo-lineata*, in which the leaves on each side the midvein have a series of divergent narrow, but clear white lines, giving them a very distinct and interesting appearance; and, 2, *roseo-lineata*, in which the leaves have a similar series of marks, but of a clear delicate pink colour. It is, however, said that markings of both these colours are sometimes seen on the same plant. From Columbia. Introduced in 1848. Flowers in ?

Neippergia chrysantha, *Morren*. Golden-flowered Neippergia (*Ann. de Gand.*, t. 282).—Nat. Ord., Orchidaceæ § Vandeæ-Maxillaridæ.—Syn: Acineta chrysantha, *Lindley*.—A very handsome stove perennial. The pseudo bulbs are large, ovate, and streaked, bearing each three to five lanceolate plaited leaves upwards of a foot long. The flowers are numerous on an erect (?) scape, which issues from the root, and reaches eight or ten inches in height; these flowers are erect, an inch and a half across, and from twenty to thirty on the scape, and of a golden yellow colour, relieved by purple dots, the lip white, and the column crimson; they are scentless by day, but have a sweet aromatic odour at night and in the morning. The plant requires the treatment of other terrestrial stove orchids. Supposed to be from Mexico. Introduced to Belgian gardens in 1848. Flowers in autumn.

Achimenes gloxiniflora, *Lemaire*. Gloxinia-flowered Achimenes.—Nat. Ord., Gesneraceæ § Gesnereæ.—A very beautiful stove herbaceous plant, with scaly rhizomes, slender erect flexuose stems, bearing opposite pale green leaves, serrated from near the middle to the apex. The flowers are axillary large, with a funnel-shaped tube, rather more than two inches long, inclined, and dilated beneath, the limb broad, spreading, five or six lobed, finely and equally crenulated on the margin, white; the throat wide with a fine tinge of golden yellow, which is prolonged to the base of the tube; on the whole inner surface are myriads of small purple dots, which have a peculiarly pleasing effect. From Mexico. Introduced to the Royal Garden at Laeken, in 1844, by M. Ghiesbreght. Flowers in the summer.

Lycaste chrysoptera, *Morren*. Golden-winged Lycaste (*Ann. de Gand.*, t. 232).—Nat. Ord., Orchidaceæ § Vandeæ Maxillaridæ.—A handsome stove epiphyte, with ovate compressed pseudo-bulbs, bearing each one broadly lanceolate plicate leaf from its summit, and one-flowered scapes from its base. The sepals are spreading, broadly ovate, oblong acute, of a deep yellow; the petals shorter, erect, oblong, deeper orange yellow, with crimson dotted lines at their base; the lip is short, oblong, concave, with three reflexed lobes, the intermediate one lanceolate, plicate-undulate, with crisped margins, the lateral ones abrupt; the colour is the same as that of the petals. The flowers have a most delicious and lasting aromatic fragrance. From Mexico. Introduced to the Belgian Gardens, in 1846, by the collectors of the Belgian Government. Flowers in autumn.

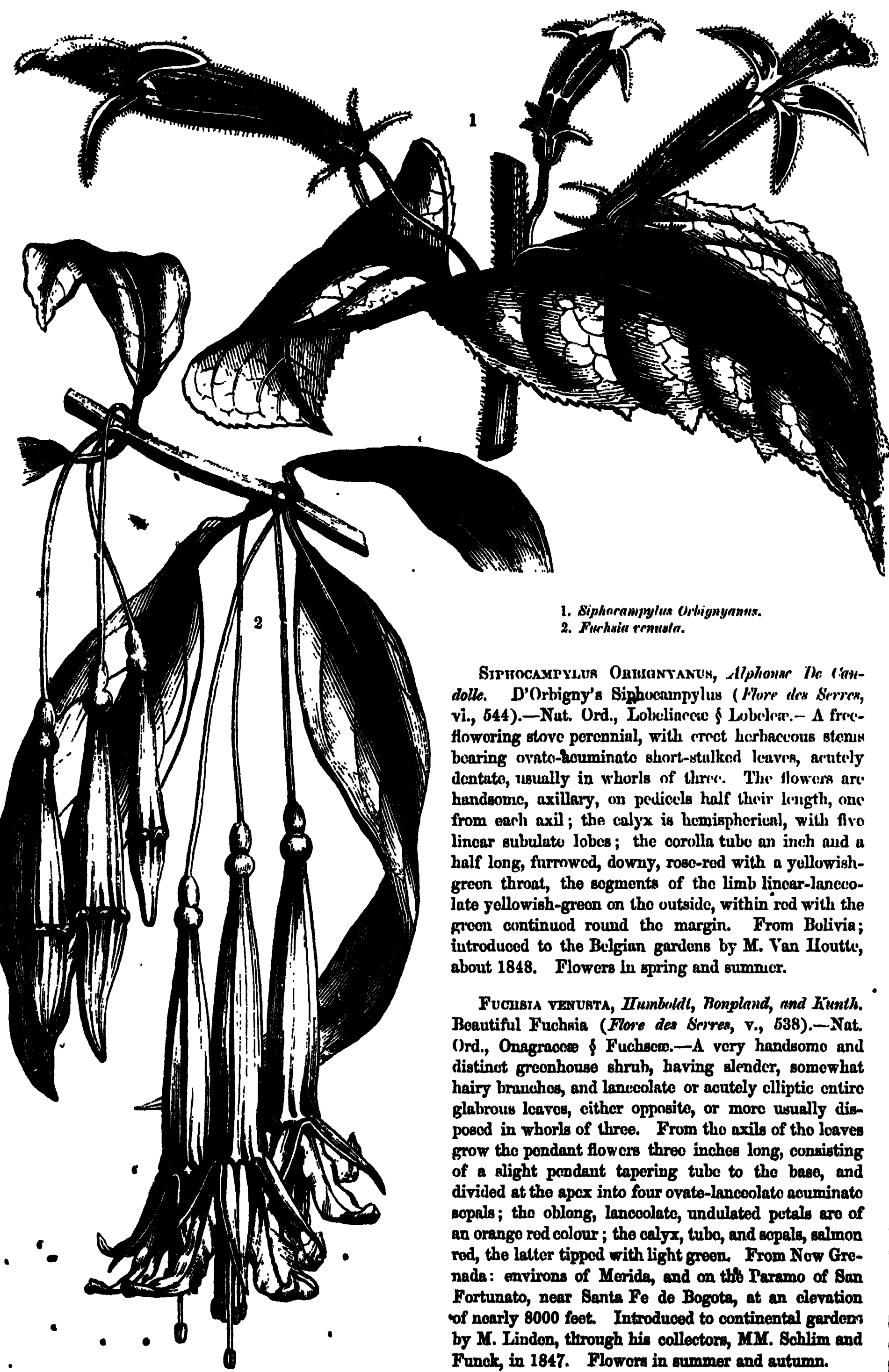
Ceanothus rigidus, *Nuttall*. Rigid Ceanothus.—(*Journ. Hort. Soc.*, v. 197).—Nat. Ord., Rhamnaceæ.—A rigid, much branched evergreen shrub, nearly or quite hardy, growing in its wild state to the height of four feet. The branches are downy when young, and are furnished with small persistent, truncate, subsessile, spiny-toothed leaves, smooth and shiny on the upper surface; netted, paler, and hairy beneath. The small flowers grow in clusters or umbels at the end of the very short spur-like branches, and are deep purplish-violet in colour, "less showy than those of C. dentatus or C. papillosus." From California: open places in woods near Monterey. Introduced in 1848 by Mr. Hartweg. Flowers in summer, or in the open air apparently in autumn. Horticultural Society of London.



Capania grandiflora: reduced.

Capania grandiflora, *Decaisne*. Large-flowered Capania (*Flore des Serres*, v. 499).—Nat. Ord., Gesneraceæ § Gesnereæ. — Syn., Besleria? grandiflora, *Humboldt*, *Bonpland*, and *Kunth*. — Drymonia? grandiflora, *G. Don*.—A beautiful perennial plant, requiring to be grown in a temperate stove. The stems are subscandent, somewhat woody at the base, with opposite, oval, stalked, softly hairy leaves, of moderate size, sometimes unequal at the base, more or less acuminate and crenate-dentate on the margin. The flowers grow from the axils of the leaves, and the ends of the shoots, on longish peduncles, which are terminated by a few (about three) large very showy blossoms on long erect pedicels; these flowers are large, nodding, irregularly campanulate, the tubes curved and ventricose beneath, the limb oblique, of five broad-spreading, nearly equal emarginate lobes; they are white, downy on the outside, the face of the limb elegantly marked with close dotted lines of rose-purple. "We may hope to see numerous hybrids combining the beauty of this type with that of other Gesneraceæ." From New Grenada: Santa Fe de Bogota. Introduced to the Continental gardens by Mr. Linden, in 1847. Flowers in ?

Thibaudia scabriuscula, *Humboldt and Bonpland*. Roughish Thibaudia (*Paxt. Fl. Gard.* i., 75).—Nat. Ord., Vacciniaceæ.—A pretty greenhouse evergreen bush, with spreading, slender, downy branches, bearing broad oblong, almost cordate leaves. The flowers are in drooping clusters from the ends of the shoots, and issue from among shining, pink, membranous, oblong scales, forming cones an inch and a half long; the corolla is a slightly swollen tube, rather more than half an inch long, hairy, rich crimson tipped with green. From New Grenada. Introduced by Mr. Purdie about 1848. Flowered in April at Syon.



1. *Siphocampylus Orbignyanus.*
2. *Fuchsia venusta.*

Siphocampylus Orbignyanus, *Alphonse De Candolle.* D'Orbigny's Siphocampylus (*Flore des Serres*, vi., 544).—Nat. Ord., Lobeliaceæ § Lobeleæ.—A free-flowering stove perennial, with erect herbaceous stems bearing ovate-acuminate short-stalked leaves, acutely dentate, usually in whorls of three. The flowers are handsome, axillary, on pedicels half their length, one from each axil; the calyx is hemispherical, with five linear subulate lobes; the corolla tube an inch and a half long, furrowed, downy, rose-red with a yellowish-green throat, the segments of the limb linear-lanceolate yellowish-green on the outside, within red with the green continued round the margin. From Bolivia; introduced to the Belgian gardens by M. Van Houtte, about 1848. Flowers in spring and summer.

Fuchsia venusta, *Humboldt, Bonpland, and Kunth.* Beautiful Fuchsia (*Flore des Serres*, v., 538).—Nat. Ord., Onagraceæ § Fuchseæ.—A very handsome and distinct greenhouse shrub, having slender, somewhat hairy branches, and lanceolate or acutely elliptic entire glabrous leaves, either opposite, or more usually disposed in whorls of three. From the axils of the leaves grow the pendant flowers three inches long, consisting of a slight pendant tapering tube to the base, and divided at the apex into four ovate-lanceolate acuminate sepals; the oblong, lanceolate, undulated petals are of an orange red colour; the calyx, tube, and sepals, salmon red, the latter tipped with light green. From New Grenada: environs of Merida, and on the Paramo of San Fortunato, near Santa Fe de Bogota, at an elevation of nearly 8000 feet. Introduced to continental gardens by M. Linden, through his collectors, MM. Schlim and Funck, in 1847. Flowers in summer and autumn.

CHEMISTRY OF SOILS AND MANURES.

By Dr. VOELCKER, Professor of Chemistry in the Royal Agricultural College, Cirencester.

GENERAL COMPOSITION OF SOILS.—ORGANIC MATTER IN THE SOIL.

WHEN we take a trip through any country, however limited its extent may be, we cannot help observing the great difference in the healthy condition of the crops in the fields we pass through. In one place we see a miserable crop, in another we admire the heavy golden ear, or the luxuriance of a green crop; in one place rich pastures refresh our eyes by their bright green colour, and not far distant we feel compassion for the half-starved beasts, feeding on the scanty herbage. In the morning we may have passed perhaps the cottage of a farm labourer, and smiled at the simplicity of taste of its occupant, exhibited in the few common flowers in his window, which to him may afford as much luxury, as the choicest and rarest collection of flowers does to the nobleman; and in the evening we may be delighted with the variety and magnificence of trees, shrubs, flowers, and rich meadows adorning the pleasure-grounds of the wealthy. At the same time we must have necessarily remarked the different appearance of the ground. White, blue, or red soils, porous, stiff, coarse, deep, or thin, hard or soft, smooth or rough soils may have met our eyes in pursuance of our journey. These external characters are open to observation, and often very striking; the most superficial observers can have no difficulty of distinguishing a peaty from a chalky soil, or a stiff clay land from a light-coloured porous sandy soil. The external characters of soils are very numerous; hence the great diversity of soils. Plants derive a great part of their food from the soil, and as different species of plants are promoted in their growth by certain substances, taken up in different proportions from the soils, and as the latter differ much in their chemical composition, as well as in physical properties, it is but natural to ascribe to the soil a great influence on vegetation. This will be admitted by every one, although it cannot be denied that situation, local influences, and, above all, climate, determine in a great measure, the existence of plants.

However great the diversity of soils may be, they are all composed of a limited number of chemical substances. These substances, amounting to twelve or fourteen, are present in all fertile soils, and the preponderance of one of the constituent parts and the different proportions in which they are mixed, determine in a great measure the character of the soil. For instance, a soil rich in lime is called a calcareous soil; and excess of clay renders the soil stiff, whilst a preponderance of sand tends to produce an open, porous, light soil. But before we shall enter into details, let us first examine the chemical nature of the materials which we find in all cultivated soils.

When we closely inspect the soil of a garden, or field, or pasture in this or any other country, it will be found to consist generally :—1. Of larger or smaller stones, sand or gravel. 2. Of a more friable, lighter mass, crumbling to powder when squeezed between the fingers, and rendering water muddy. 3. Vegetable and animal remains (organic matter).

The means by which the sand, gravel, and stones are separated from the finer portion, and all from the organic matter are very simple, and as they enable us to ascertain the nature of the stony fragments, the sand, and other materials, forming the component parts of the soils, we shall briefly describe them :—

1. A portion of garden-earth, or soil from the field, is soaked in rain or distilled water, in an earthen-ware basin or Florence flask, agitating it occasionally in order to break any hard lumps of earth. Hard lumps of clay often take a long time before falling to powder; it is better, therefore, to rub the soil with the pestle and mortar and a little water at first, adding more water afterwards. By allowing the whole to remain undisturbed for a few minutes, the sand, fragments of stones, larger remains of roots, &c., on account of their greater specific gravity, will settle to the bottom of the vessel almost immediately, whilst the finer impalpable powder will remain floating in the water, rendering it muddy. This muddy liquid is poured off in a tumbler or glass bottle, and the deposit washed repeatedly with new portions of water until the water ceases to become muddy. The sand, &c., thus freed from any adhering fine clay, is preserved for further examination.

2. The muddy liquid poured off from the sand is allowed to remain at rest in the tumbler or glass bottle, until the fine mud has completely settled at the bottom of the vessel, and the water above it has become perfectly clear. The latter is then poured off, and the remaining fine mud dried.

3. The clear water from 2. is evaporated to dryness in an earthen-ware, or better, porcelain basin. The residue, inconsiderable in amount, will be found to vary in quantity and composition, according to the nature of the soil. It is generally coloured brown by some soluble organic matter.

4. The gravel and sand, the fine mud, and the residue of the watery liquid, into which we have separated the soil by this simple process, are mixed with organic matter; by washing, therefore, we can only separate the soluble organic matters from the insoluble, and the finer vegetable remains from

the larger pieces of roots, stems, &c. The soluble organic matters remain in solution, the finer with the mud of No. 2, and the coarser with the sand and gravel. If we wish, however, to separate the organic matters completely from the other constituents, we heat a portion of the soil in an iron spoon or platinum dish, to redness. The organic matter will first blacken the soil, and disappear entirely when the heat is increased and continued for some time, leaving the *incombustible* matter behind, generally coloured red by oxide of iron, which is present more or less in every soil. The organic part of the soil, or that which burns away when exposed to heat, is likewise called the *combustible* part of the soil. We shall see presently how it is formed, what its composition and its functions in the soil are. But first we must examine more particularly the nature of the substances which we find in the three portions into which we have separated the soil by the simple process of washing as it is called. By this process we have obtained:—1. Stony fragments, sand and gravel, and coarser organic matters. 2. An impalpable powder, and finer organic matters. 3. Soluble organic and inorganic matters.

1. The sand, gravel, and larger stony fragments are easily separated from each other by a small sieve, after having been first dried. They result from the decomposition of the solid rocks, and as the variety of rocks is very great, we find the characters of the sand and gravel varying very much. For instance, granitic and some of the primitive rocks yield fragments composed of mica, felspar, quartz. Oolitic rocks, fragments of limestones, sandstones furnish grains of sand, &c.

2. The impalpable powder, on examination, will be found to be a mixture of clay with finer fragments of the stones and gravel and organic matter. In it the chemist will distinguish alumina combined with silica, free alumina, free silica, more or less oxide of iron, oxide of manganese, lime, magnesia, potash, and soda, and traces of phosphoric, sulphuric, and carbonic acid. Of the above substances, silica, a substance called in common day life sand, preponderates in all soils. The presence of organic matter is recognised by the black colour the powder assumes when heated over a spirit-lamp.

3. The watery solution of the soil, evaporated to dryness, leaves behind an inconsiderable residue, generally coloured brown by organic matters, which may be driven off by heat. In most cases a few grains only will remain, even if a large quantity of soil has been used. In the combustible or the organic portion of this residue the chemist can easily detect the presence of ammonia, of humic, ulmic, crenic, and apocrenic acids (substances known under the common name of soluble humus). In the incombustible portion he will generally find, by means of chemical tests, potash, soda, lime, magnesia, phosphoric acid, sulphuric acid, silicic acid, chlorine, and occasionally oxide of iron and manganese, nitric, iodine, and bromine. The two latter substances, iodine and bromine, are of rare occurrence, and only met with in soils inundated by the sea or by the waters of some salt springs.

All cultivated soils present a great similarity of composition; they all contain the enumerated chemical constituents. This similarity becomes still more apparent, when we burn the soils, in which case they, with the exception of chalk soils, assume a red colour, which is due to the presence of oxide of iron. At first sight this might be regarded as opposed to the great diversity of soils; but if we examine the relative proportions in which the above-named substances are mixed, their state of combination, and the manner in which the different soils are formed, we shall find that diversity is perfectly compatible with a certain similarity of the elementary composition. The fact is, an analysis of a soil which represents nothing else but the percentage of silica, oxide of iron, alumina, potash, and other substances which enter into the composition of soils, is incapable of throwing light on its fertility, agricultural capabilities, and general nature. The state of combination in which the inorganic matters are found, their origin, physical characters, the nature of the organic matters and other circumstances, to which we shall afterwards refer, must be taken into account, before we can reasonably form an opinion as to the fertility of a soil.

Having given the general composition of cultivated soils, we now proceed to examine the origin and chemical nature of the combustible part or the organic matters of the soil. Soils differ much in their character, agricultural capabilities, immediate origin, yet they all agree in containing organic matter in larger or smaller quantities. This organic matter appears essential to a healthy growth of plants; in no fertile soil it is wanting; all cultivated soils contain an appreciable quantity, varying from ½ per cent. to 10-12 per cent. Rich black garden mould often contains 20-24 per cent. of its own weight of organic matter, and in peaty or boggy soils the proportion frequently amounts to 60-70 per cent.

In good garden land the organic matter amounts to 10-12 per cent. on an average; the best soils of our fields seldom contain more than 6 per cent. Although a certain proportion of organic matter is always found in fertile soils, yet the relative larger or smaller amount must by no means be taken as a criterion of their capabilities, simply because there are other substances which have a direct influence on their fertility. Thus a soil containing 6 of 10 per cent. of organic matter may be much inferior to one which contains but 2 per cent. In soils celebrated as good wheat soils I found myself not more than

3-3½ per cent. of organic matter, whilst in very inferior soils, which I have examined, the per centage amounted to 12-15 per cent. In corroboration of the former results, I may be allowed to state those of Dr. Anderson recently obtained in the analyses of some of the best wheat soils from different districts of Scotland, and published in the *Scottish Journal of Agriculture*, for July, 1850.

	Per centage of organic matter in soil.	Per centage of organic matter in sub-soil.
Mid-Lothian, Wheat soil	10·1981	4·8358
East Lothian, „	6·3271	5·8554
Renfrewshire, „	7·3625	4·6932
Perthshire, „	8·5508	6·8270
Morayshire „	4·5460	3·7660
Morayshire, wheat soil of a different description	3·4760	—
Berwickshire, Wheat soil	6·670	—

The organic matter is of a very complex composition, and owes its origin for the greater part to vegetable remains, as the roots, stems, &c., of former crops, and partly to animal matters, derived from the decay of insects, all added purposely in the form of manure to the land.

The vegetable and animal remains, under the influence of water, air, and heat, gradually decay, producing a brownish or black powdery substance, or rather a mixture of substances, which are known to the practical gardener under the name of humus or vegetable mould. It is by no means a simple substance, but it is composed of a great many organic acids and products of vegetable decomposition. There are particularly two kinds of humus—brown and black—the first is contained in large quantities in the brown variety of peat; the latter, or black humus, the result of further decomposition of the brown, is found in black peat. The earthy brown or blackish substance deposited in the interior of hollow trees is the same complex substance commonly called humus.

It is not my intention to enter into a minute description of the composition and chemical character of humus. Suffice it to mention the names of some of the vegetable acids which are found in the substance called humus, by the practical man, viz.: ulmic, humic, crenic, apocrenic, and geic acids. These organic acids resemble each other very much in their general aspect, as well as in their composition. Ulmic and humic acid may readily be extracted from peat,—the first from brown, the latter from black,—by boiling the powdered peat with a diluted solution of common soda of the shops. These acids enter into combination with the soda, forming a soluble dark brown coloured product, from which they are readily separated by an acid, which has a greater affinity for the soda than the vegetable acids. On the addition of muriatic acid, or spirits of salt, for instance, to the brown solution obtained by boiling peat with carbonate of soda, a dark brown or blackish-coloured, flaky, voluminous substance is separated, which, collected in a filter, washed and dried, constitutes a blackish, tasteless very hygroscopic substance, devoid of smell. Chemically speaking, this substance is a mixture of ulmic and humic acids,—ulmic acid prevailing if brown peat be used, humic acid if black peat.

Humus and the other organic substances found in the soil play an important part in the processes of nutrition of plants. Perhaps too much importance has been attached by former naturalists, and by many practical men this is done to the present day. The fertility of a soil is estimated by them by the quantity of humus, which they regard as the only, or, at least, as the chief nourishment of plants. Recent researches, however, have shown distinctly the great influence which the inorganic matters exercise on the growth of plants, which inorganic substances are taken up by the roots, and discovered in the ashes of plants. It has further been proved experimentally that organic matters only are incapable of supplying all the wants of the growing plant, but that every plant requires certain inorganic substances, which if not present in the soil will set a barrier to its healthy growth. The part humus plays in the nutrition of plants has been lately the subject of much discussion, and many controversies amongst chemists and physiologists. The most opposite opinions have been held out, volumes of papers have been written on this subject; the undeniable effects of humus on vegetation have been explained according to preconceived theories, and the efficacy of organic matter in the soil has even been denied altogether in spite of all practical experience. It would be unprofitable to the general reader to criticize all the different theories. There can be no doubt that humus supplies plants with food—whether with organic food alone, or inorganic likewise, or whether it exercises merely a beneficial influence on vegetation, in furnishing a continual source of carbonic acid, arising from its decomposition, or whether it acts likewise beneficially in condensing ammonia gas from the atmosphere we will not here discuss. Humus certainly performs a most important part in the soil, and acts beneficially on vegetation in more than one way; for that reason all attempts to explain its functions by *one* action only must be unsatisfactory, and might lead the practical husbandman to serious errors in the management of the land.

Miscellaneous Notices.

Botanical Society of Edinburgh, June 13.—Dr. Balfour announced that the Commissioners of Woods and Forests had agreed to form a Botanical Museum in the Royal Botanic Garden, and called upon all who were interested to contribute liberally, for the public benefit, specimens of Woods, Fruits, and Vegetable products, articles of Vegetable Manufacture, Fossil Plants, Drawings, &c. Mr. Evans directed attention to a curious instance of the effects of the graft upon the stock, which had occurred in a tree at Morningside House, the residence of Mr. J. Deuchar. The tree in question is Pyrus Aria, grafted upon P. aucuparia as a stock. Its entire height is 18 feet, and the stock forms a clean trunk to the height of 4 feet, where the union of the graft and stock is conspicuously shown. At 13 inches from the base of the trunk there are shoots of P. aucuparia, and at the height of 1½ feet *branches of P. Aria* appear (being 2½ feet *below* the point of junction), while farther up the trunk a branch has been accidentally taken off, which is believed to have been P. aucuparia. Mr. M'Nab exhibited a peculiar creeping form of *Sarothamnus scoparius* (common Broom), which had been sent from Alderney. Mr. M'Nab also made a communication on the effects of Lightning on Trees. He remarked:—"A few days ago I accidentally heard of a tree which had been struck by lightning on the 5th instant (June, 1850), at Pitferrane, Fifeshire, the residence of Andrew Buchanan, Esq.; and, being anxious to ascertain the species, I wrote for a small branch, with any history which could be given regarding it. I have just received the leaves shown, which prove it to be the Ulmus montana, or Wych Elm. My object in bringing the notice before the Society is to ascertain from its members any varieties of trees known to them as having been struck by the electric fluid. About this time last year a very large Oak, on the grounds of John Wauchope, Esq., of Edmonston, was shattered to pieces; and a few years previously a Laburnum, standing close to the Oak, was likewise destroyed. While on a tour over a portion of the American continent some years ago, I had several opportunities of observing gigantic trees torn to pieces by electric influence. In every instance observed, they were Oaks. During a thunderstorm I found the workmen (chiefly in Canada) resorting to the Beech trees for protection, from an idea that they were not liable to be struck by lightning; certain it is that I saw none, notwithstanding the prevalence of large sized Beeches in many districts. The Elm above alluded to at Pitferrane had an iron fence standing close to it, which was supposed by the inhabitants to have had some influence in attracting the fluid. The above observations are thrown out, in the hope of ascertaining if there be anything in the composition of one species of tree rendering it less liable than another to electric influence." Mr. Brand stated that he knew a marked instance of a Beech in Aberdeenshire having been struck by lightning. The Horse Chestnut and Ash were mentioned as having been struck. Specimens of Anacharis alsinastrum, from Watford Locks, Northamptonshire, were exhibited from Mr. T. Kirk. [Our own experience of the manner and rate of the growth of this plant leads us to believe it is not a native of this country.]

Botanical Trip to Aberdeen.—The Professor of Botany in the University of Edinburgh usually devotes the Saturdays throughout the summer session to excursions in the neighbourhood of Edinburgh, thus enabling the botanical students to put into practice in the fields the instructions received in the class room. These excursions have never before been to any great distance from Edinburgh, a long Highland tour being generally undertaken at the end of the session. On the 30th of June, however, the Professor, accompanied by upwards of a hundred students of his class, set out on an expedition of a more extended kind than had ever before been undertaken in a single day by any party of botanists. They started from Edinburgh by the Northern Railway at 5, on the morning of the day mentioned, and proceeded northwards, passing through the counties of Fife, Perth, Forfar, and Kincardine, to the city of Aberdeen (distant from Edinburgh about 135 miles), which they reached between 10 and 11 A.M. After breakfast in the Royal Hotel, the party visited King's College, to admire the antique relics which it contains, and being there joined by Dr. Dickie, Professor of Natural History in Queen's College, Belfast, they proceeded some miles to the north, passing the picturesque bridge of Don, to the woods and moors at Denmore. Here every spud was unsheathed, and the botanists, spreading themselves through the woods, soon replenished their boxes with a goodly supply of the floral rarities which the place produced, such as Linnæa borealis, Drosera anglica, and rotundifolia, Sedum villosum, Trientalis europæa, Veronica scutellata, Goodyera repens, Habenaria bifolia, Pyrola minor, Mimulus luteus, Schœnus nigricans. The botanical army then remounted their vehicles and returned to the sandy Links of Aberdeen, where a number of maritime species were added to their stores. Among the more interesting plants there collected, we may mention Cerastium atrovirens, Carex incurva, Potamogeton pectinatus, Triticum junceum, and Thalictrum minus. They then visited the Granite Polishing Works, the Marischal College, the Medical Buildings, and the New Market Place—the formidable appearance of the band, with their noisy tin boxes, and other botanical appurtenances, creating quite a sensation in the northern city. After dinner in the Royal Hotel, they entered the train at 6 P.M., for Edinburgh, which they reached at a late hour. The weather was delightful, and altogether the excursion was an exceedingly pleasant one; for although 270 miles were gone over by rail, any uneasiness from the long ride was prevented by the interesting character of the country through which the line lay—embracing the fertile vale of Strathmore, and other districts of agricultural celebrity, with here and there a neat little village, a range of heath-clad hills, or a placid lake with its white swans and water-lilies floating on the unruffled surface.

We understand that the Professor has arranged for an expedition to the Clova mountains, with a party of his students, to be accomplished in the incredibly short space of two days.

FLORISTS' PELARGONIUMS.

Nat. Order, **Geraniaceæ.**

Generic Character.—Pelargonium, *L'Heritier.*—*Calyx* five-parted; the lobes sub-equal, the posterior produced at the base and adnate to the pedicel, so as to form an adherent spur, of variable length. *Corolla* of five petals, rarely by suppression four, or sometimes two, inserted at the base of the gynophore, alternating with the lobes of the calyx, clawed, equal or unequal, obtuse, caducous. *Stamens* ten, inserted with the petals, coherent into a tube below, unequal, the alternate stamens opposite each petal shorter, on a barren filament; filaments flattened, membranous, subulate from a broad base, the posterior often more produced; *anthers* introrse, two-celled, incumbent, obtuse, dehiscing longitudinally, caducous. *Ovaries* five, oblong, adnate to the broader base of the elongated columnar gynophore, which is a little shorter than the styles, one-celled, two-ovulate; *ovules* ascending, or suspended; *styles* filiform, distinct at the base, adherent longitudinally to the gynophore, contracted and coherent together above the gynophore, free at the apex; *stigmas* introrse, lateral. *Capsules* five, oblong, with tails consisting of the styles elastically separated from the columnar gynophore, the styles being flattened, villous within, and spirally twisted below; the capsules at first suspended by the styles to the summit of the gynophore, these afterwards becoming detached; capsules one-celled, by suppression one-seeded, dehiscing by the ventral suture. *Seeds* three-sided; testa crustaceous.—(*Endlicher, Gen. Plant.* 6048.)

§ **Pelargonium.**—Petals five, unequal, the two upper approximating. Stamens ten, unequal; seven fertile, the rest sterile, subulate.—Soft-stemmed undershrubs; or dwarf herbs, often with short, fleshy, bulb-like, underground stems; natives of the Cape of Good Hope. The cross-bred varieties, so abundant in gardens under the popular name of Geraniums, have sprung from the shrubby section.

Florists' Varieties:—1. *Hoyle's Ocellatum.*
2. *Hoyle's Ajax.*
3. *Hoyle's May Queen.*

Description.—The varieties represented in the accompanying plate are among the most distinct and meritorious which have appeared at the London exhibitions during the present year. They were raised by G. W. Hoyle, Esq., of Reading, a gentleman who, in the present day, is well known as one of the most successful raisers of seedling Pelargoniums. The variety named Ocellatum is a most striking flower, and though less perfect in technical points than the others, will find more admirers, in consequence of the gay and striking effect produced by its fine spotted flowers; it will be an excellent sale plant, and possesses the valuable character of constancy, having been exhibited in a perfect state through the whole season. Ajax is one of the best formed varieties yet raised, and its purple colour gives it additional value, now that rosy-coloured varieties are so common. May Queen is a flower of large size, with a pure white centre, and finely clouded top petals, the general form good, and the colours lively. Our colourers fail in their attempts to give the rich tints of these high bred Pelargoniums. We understand these, and some other of Mr. Hoyle's seedlings are now in the possession of Mr. Turner, of the Royal Nursery, Slough.

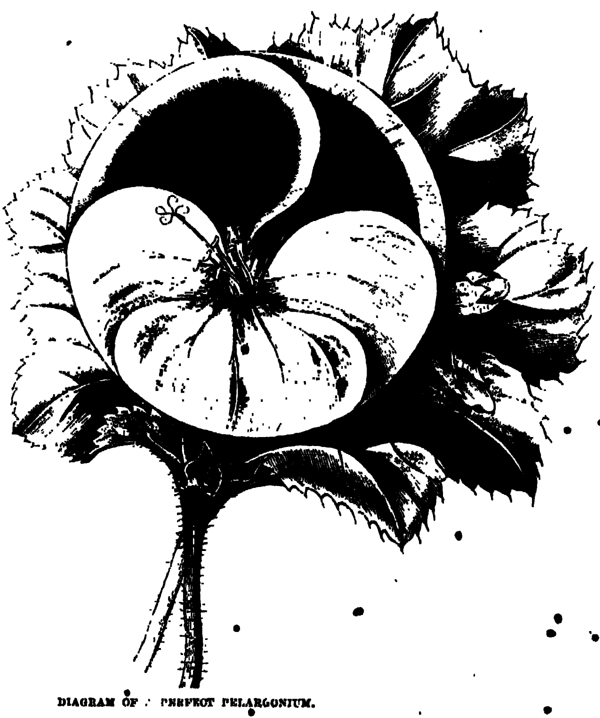


DIAGRAM OF PERFECT PELARGONIUM.

Culture.—Pelargoniums require a rich light loamy soil, and liberal treatment while growing; protection from frost at all times, without a close or hot confined atmosphere at any time; and "stopping" up to a period earlier or later in the season, according to the time when the blooms are required. When growing freely they like plenty of water—that is, if, as they should be, thoroughly drained—and a little weak manure water every second or third watering as they approach blooming greatly invigorates the flowers. To preserve the latter, shading and netting are indispensable. Cuttings root freely in sandy soil, in a cold frame, under a hand-glass, or in a cool shady border, any time during summer.—M.

THE PROPERTIES OF THE PELARGONIUM.

By Mr. G. GLENNY, F.H.S.

THE properties of the Pelargonium were published by us some years ago, and before anybody had even formed an idea of what a flower ought to be. Colour and size seemed to be the leading, if not the only objects of the raisers, and some of the early varieties, that bore a large price, would not even be looked at in these days. Novelty, we will grant, covers a multitude of blemishes; but the Pelargonium, in those days, was at best a fragile flimsy flower, and lasted but a short time in bloom. Breadth and thickness of petal were wanted more than anything, as starting qualities; the one to give form, the other permanence, or at least durability. Dennis's Perfection was one of the first we recognised as a distinct improvement—for we talked of the Properties a long while before we published them; and that variety bore a considerable price.

It was observed that the Pelargonium, like the Pansy, required to be round to be perfect; that the petals should be thick and smooth on the edges; with a moderate truss of flowers of good size; a stocky shrubby habit; good, bold, but not coarse, foliage; and abundance of flowers. Nobody would dispute these general properties; but, when we come to colour, no two agree, except that there must be a dark blotch on the upper petals. We simply want a dense colour whatever that may be, because washy, weak, or watery shades look poor; and if there be two colours we want them to be well defined and contrasted. Everything cloudy, shady, and undecided is ineffective; but as to what the colour or shade shall be, we leave among those matters that are to create the variety, and will not give a preference except on the general principles of the greater the contrast the better, and if there be any brightness at all, the newer the colour the better. [Most of these points are represented in the diagram on the preceding page.]

Ajax, one of the subjects of the foregoing embellishment, is a novelty, and as such deserves a high place even among the best; not but that it might be a better shape and have a thicker petal, but it is as good as our so-called first-class flowers in these matters, and is a good colour. Everybody must therefore grow Ajax for the sake of its novel purple colour, and its average goodness.

Ocellatum is also a novelty; its peculiar spotting reminds us of some of the old Geraniums, for although so much better in form, the spots are remarkable. As a show flower we do not like it, for although the lower petals are broad, and it is a good average form, there is no boldness, no grandeur in its bloom. It is new, bright, strikingly novel; but though every cultivator will covet it, and it will be one of the best market plants that has been raised for years, it will not please in competition with the regular show flowers. The spot somehow gives the appearance of narrowness to the lower petals.

The May Queen speaks for herself. We have seen many other seedlings, some few of which will no doubt be popular. The most striking perhaps were the Gipsy Rival, which we could not recognize as any better than the Gipsy Bride—perhaps if they had been compared we might have discovered some advance. Silkmercer, an odd title for a Pelargonium, is a singular purple; it has a fold in the back petals, but has many good points, among which it has the best habit of any we have seen; Little but Good, is pretty. But the variety on which some of the principal growers pinned their hopes was Incomparable, on which however, we have not seen one perfect truss in full flower; whether the flowers will not open together, or many come false, or whatever else may be the cause, we have rarely seen more than two good blooms open at once on the truss. We have notes of some others that we must mention at the close of the season, when we have seen all.

STANDARD CAMELLIAS.

By Mr. P. F. KEIR.

THERE can be no question as to the propriety of training the Camellia in the way it is commonly seen, but there does not seem to be any reason for supposing that it may not be trained in other ways with as much effect as can be attained by keeping it in the usual bush-like form. Its habit, its fine deep-green foliage, its beautiful flowers, all seem to point it out as capable of being grown as a standard with admirable effect. There are, it is true, plenty of large plants of this favourite flower; but generally these are of a bad shape, and are only fit to occupy the back part of a greenhouse, where their naked stems may be concealed by better plants. Such lanky plants can never be made available, as single specimens, to occupy prominent positions in a conservatory.

In training the Camellia as a standard, we must be guided by the same principles which are followed in the case of other ornamental flowering shrubs. If young plants are to be grown into low standards, the regulation of the branches must be attended to at a very early stage of growth. The main stem should be allowed to grow two or three feet clear of shoots, before the branches are adjusted. Five or six branches should, if possible, be retained to form the base of the head, and other lateral shoots must be encouraged to grow on the central or leading branch. It is desirable that such plants should be kept from flowering for two or three years, or until they have acquired the desired form; they must also be shifted into larger pots whenever their roots are strong enough to warrant the operation. The best time to shift them is in the spring, just before they begin to grow, for then the plants are provided with their nourishment at the most natural season. The best compost for the Camellia is a mixture of loam and peat with sand, the loam considerably preponderating as the plants become large. During the summer, while making their growth, the plants should be kept in a cool house, and freely supplied with water at the roots. They should also be often syringed, for the purpose of refreshing the foliage, and they must be kept free from the green fly, an insect which very commonly infests the tender shoots. The plants must not be deprived of light, but some light shading material should protect them from the full glare of the sun. Where standards with clear stems of six or eight feet high are wanted, it is not desirable to sacrifice time, or a good kind, for the purpose of training it up to the height required, from a young plant, as the object can be attained by grafting on a stock of the old C. reticulata, or any other sort, the flowers of which are of an equally inferior character. Any old plants, therefore, which, from bad treatment or other causes, may have become lanky, may be turned to good account in this way, by grafting or inarching them with superior varieties.

Stocks grown for the purpose of being worked as standards, should be allowed to make their growth in a situation where they receive light only from above. For such a purpose, a temporary enclosure may be formed by means of common mats, and a space of a few feet square will contain many plants. An enclosure may be formed thus: in any corner formed by two walls of eight or ten feet high, and where the aspect is westerly, drive down a pole of a convenient length, at the required distance from each wall, and by means of this a space can be enclosed with mats or canvas. Some structure of this sort where the light is only admitted at the top, is the most suitable for keeping stocks that are wanted to grow long and straight. While the stocks are growing, all lateral shoots that appear on the lower part of the stem, must be cut off. The head should be kept moderately thin, and the leading or central shoot carefully protected from damage, and encouraged as much as possible. When the stock has attained the desired height and thickness, the top should be cut off, and the operation of grafting performed. It is, however, advisable to cut off the top a week or two before the scion which is chosen is put on.

For grafting on high stems, the shoots of such varieties as have the most spreading habit should be selected, so that when the head has grown a year or two, the branches by their own weight may assume a somewhat drooping, or, at least, a spreading form. Assuredly, nothing could be more graceful during winter and early spring, than a well-managed Standard Camellia, with its branches bending under their load of beautiful flowers. Such a plant, or rather tree, may stand alone, or it may be placed, for the purpose of hiding its bare stem, in the centre of a group composed of a variety of other sorts, or even in the midst of a miscellaneous collection of conservatory plants. It must certainly be allowed that the habit of the Camellia is not quite favourable for training standards into a drooping form, yet it is sufficiently pliant to yield, in a great measure, to a system of constant and careful pruning, such as encouraging the lateral branches in a horizontal direction, and cutting off such shoots as incline upwards. Tying down the main branches may also be practised with success during the first two or three years, after the grafts have become strong enough, but the process of bending them down must be very gradually and carefully performed.

Although, in the course of training the stock for high standards, it is necessary to keep it perfectly bare below, such nudity is not an absolute condition of growing the Camellia in this way, for as many buds or grafts can be inserted over the whole surface of the stem, as may be desired, provided they are not too thick, or so numerous as to affect the free growth of the top. In such cases, however, the stem should be allowed to attain a moderate height and size before the buds are inserted on it. As a general rule, it is desirable to keep the shoots which are thus produced on the stem rather short, and they will be thick enough, if kept about a foot apart at the point of insertion. These buds or grafts may be of different varieties, and, for the sake of increasing the effect, the varieties may be as varied as possible; at least a dozen different sorts may be thus distributed along a stem six feet high, and so arranged that the colours may harmonize with one another.

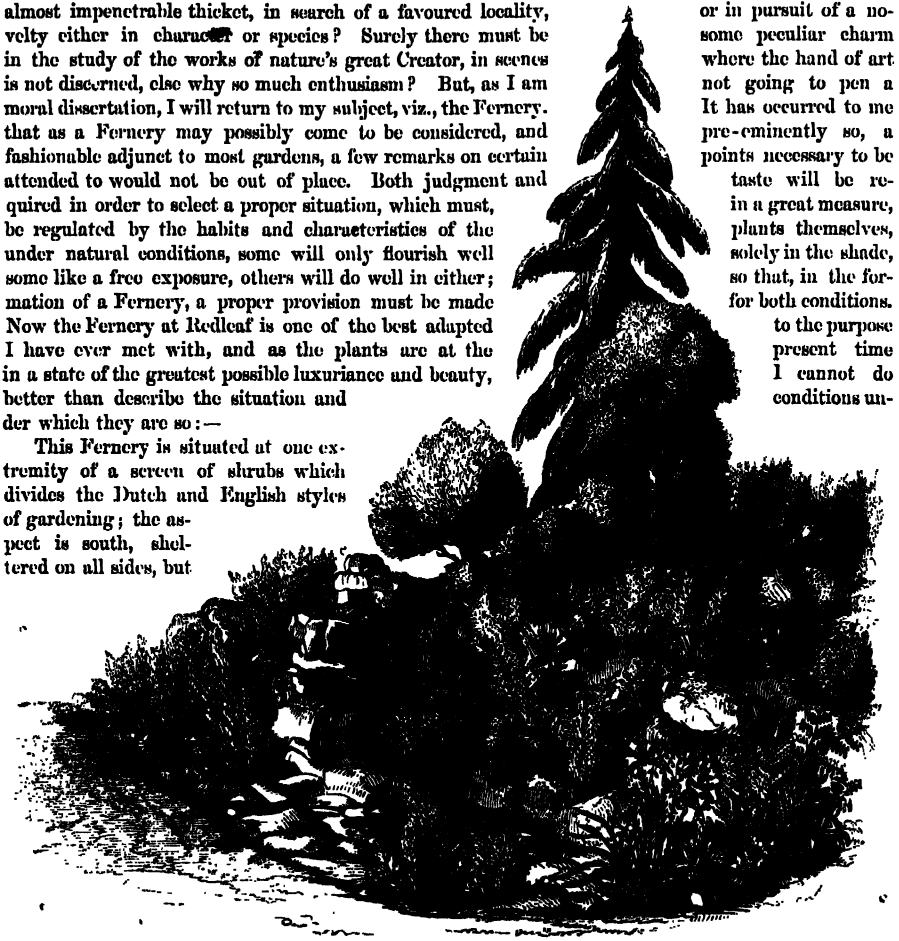
This method of forming Camellias undoubtedly involves much patience, but when good stems can be procured, the amount of this essential ingredient of success in all undertakings is considerably diminished; and, in any case, the object to be attained is so interesting and permanent as to outweigh all ordinary considerations.

THE HARDY FERNERY.

By Mr. JOHN COX, Gardener to W. Wells, Esq., Redleaf.

FROM the increasing interest which of late years has been taken in the culture of the beautiful and interesting tribe of Ferns, we may infer that there will be few gardens of any pretensions without a Fernery. Never was the seal of fashion impressed upon a subject more interesting and deserving than this, nor on one more likely to return ample gratification to the ardent votary. Who can witness without a glow of delight the enthusiasm with which many persons (ladies even) pursue this favourite study, braving the summer's scorching heat, climbing the steep crag, or penetrating the almost impenetrable thicket, in search of a favoured locality, or in pursuit of a novelty either in character or species? Surely there must be some peculiar charm in the study of the works of nature's great Creator, in scenes where the hand of art is not discerned, else why so much enthusiasm? But, as I am not going to pen a moral dissertation, I will return to my subject, viz., the Fernery. It has occurred to me that as a Fernery may possibly come to be considered, and pre-eminently so, a fashionable adjunct to most gardens, a few remarks on certain points necessary to be attended to would not be out of place. Both judgment and taste will be required in order to select a proper situation, which must, in a great measure, be regulated by the habits and characteristics of the plants themselves, under natural conditions, some will only flourish well solely in the shade, some like a free exposure, others will do well in either; so that, in the formation of a Fernery, a proper provision must be made for both conditions. Now the Fernery at Redleaf is one of the best adapted to the purpose I have ever met with, and as the plants are at the present time in a state of the greatest possible luxuriance and beauty, I cannot do better than describe the situation and conditions under which they are so:—

This Fernery is situated at one extremity of a screen of shrubs which divides the Dutch and English styles of gardening; the aspect is south, sheltered on all sides, but



SKETCH OF THE FERNERY AT REDLEAF.

open above head. It is formed of a large mound of earth faced with large angular pieces of rock, which advance and recede, project prominently forward, or fall far back, so as to produce a great diversity of surface, and plenty of light and shade, such as an artist's eye delights to rest upon. In the centre is an irregular shaped basin for water, the large stones which form the base of the surmounting rock-work projecting over the edges of the basin, and have a fine effect, giving at a little distance great depth of shade. The walk, which curves around the base of the rock-work, is trellised over to the height of eight feet, quite to the ground on one side, but with wide openings on the side nearest the Ferns. This trellis is covered with Roses, Clematis, Glycine, and other climbers, and is of itself very pleasant, forming what Dr. Carus, in the King of Saxony's *Tour*, has amusingly called "a leafy alley of Psoralea;" at all events, it forms that kind of shade to the lower part of the Fernery which the plants so much delight in.

As this short description of what is known to succeed well, embraces most of the points necessary to a good choice of situation, I will only here remark that there is room for an infinite diversity of taste in the arrangement, only observing to secure a good amount of shade to the lower part; but not by covering over, as Ferns will not flourish well under too much drip, neither will they do so well when the shading is produced by any opaque substance, as a wall. I do not mean to assert that they will not grow under different circumstances, but I do say, that the kind of shade I recommend approaches nearer to that under which, in a natural state, Ferns are found most luxuriant.

[The hardy Ferns at Redleaf have an admirable effect, growing in the situation described by Mr. Cox; and which they appear to enjoy infinitely. At the time we saw them, they were in a very luxuriant condition, proving without doubt the perfect adaptation of the situation to their growth. Most of our native species were noticed there, though the effect *en masse* was chiefly produced by the larger Ferns, such as Osmunda regalis, Athyrium Filix-femina, Polystichum angulare, Lastrea Filix-mas, Scolopendrium vulgare, Blechnum Spicant, and the Lastreas of the "dilatata" group. Onoclea sensibilis was also conspicuous, growing with remarkable vigour, both here and in other parts, having fully localized itself about the bases of the large blocks of sandstone, which give such an expression to the pleasure ground at Redleaf. Of rarer kinds we particularly noticed fine tufts of Osmunda spectabilis, and of Adiantum pedatum, two very elegant North American species.—M.]

ON THE APPROPRIATE EMBELLISHMENT OF GARDEN SCENERY.

By Mr. H. Bailey, C.M.H.S., Gardener to G. Harcourt, Esq., Nuneham Park.

THERE are, perhaps, few persons in the present day, who are in possession of a garden, who would not feel offended if their taste, or rather dogmatical caprice, in the use of decorative objects were to be called in question. Notwithstanding this, however, it is a fact that the most crude misconceptions prevail, and the most egregious absurdities are perpetrated.

Without attempting to impugn the right which every man claims "to do what he likes with his own," it will readily be admitted that all are amenable to criticism, and that what is commonly called *taste*, instead of being a mere *ad libitum* impulse, is, in fact, founded upon fixed and recognised principles, which can no more be departed from with propriety, than the just proportions of architecture can be deviated from in constructing a Grecian temple.

An object may be in itself highly beautiful, or possess that indefinite quality which is termed "pretty;" but it ought also to have some relation to other objects in the scene of which it forms a part. A perfect whole can never be composed of incongruous parts, and harmony and unity of expression are indispensable qualities in a perfect garden, no matter whether it is that of an unpretending cottage residence, or Palladian palace, the baronial castle, or the old conventual religious house.

The use of what is called "rustic" ornaments, as vases and baskets for flowers, has latterly been carried to a great extent, and in too many instances with the most unhappy effects. How often do we see these things associated with architectural balustrades, Grecian vases, piles of stones (misnamed rock work) on smooth lawns, each of which may have its proper and legitimate place in a garden and be introduced with admirable effect, but thus mixed, forming a discordant whole, "a thing of shreds and patches."

We should not, and do not, object to rustic baskets in the garden of a romantically situated cottage; but in a residence of any architectural pretensions, the whole of the subordinate objects pertaining to the garden, as seats, flower-baskets, vases, &c., should have the same expression as the house, the impress of high art and adaptation for the use of highly civilized man, cannot be too evident; and as no garden is ever to be imagined to be anything but a work of art, so should it bear unmistakeable evidence of design and harmony in its minutest details. There is, perhaps, no better illustration of the want of attention to this principle than may be found in the enchanted valley at Alton Towers. The situation is beautifully romantic, but it has the greatest assemblage of discordant objects that can be conceived, temples, fountains, rock-works, Swiss cottages, and many other objects equally inharmonious, produce an impression of wonder at the perversion of wealth, rather than the display of taste.

Each different style of building gives permission for ornamenting our gardens with statues, balustrades, and other masonry, thus carrying the eye from the ornaments of the drawing-room and saloons of the mansion, to those of the grounds in the immediate vicinity, and presenting the spectator with a *tout ensemble* of consistent beauties.

Rock-work is a difficult thing to treat well; it is too generally seen as a mere hillock of rubbishing stones on a plain surface of turf, looking like a scar in a polished scene, and having no connection or relation to any other object. Happy effects, however, may be produced by introducing it as an episode. In such a position it will form an agreeable contrast to the more artificial scenes of a garden. In speaking of rock-work, I do not by that term mean those unmeaning aggregations of small rubbish which are so commonly seen, and which, from want of breadth in the masses, produce no effect; but of large massive blocks, thrown together in picturesque forms in humble mimicry of those aggregations of granitic rock which one meets with in Devonshire.

But while we seek to make our gardens replete with consistent ornaments, we must not forget the beauty of utility, which is of first-rate importance. We must then endeavour to combine use with ornament, and we may remember (*cæteris paribus*) that those objects which combine abstract beauty with utility will ever be more satisfactory than those which are simply beautiful, or simply useful. Man in his rude state is satisfied with those things which minister to his necessities; more civilized man aspires to something higher. He adopts the most elegant forms and the most elaborate designs, making them subserve his convenience.

There is now no lack of elegant designs for garden purposes, but let those who are introducing such adjuncts beware that they preserve the expression of unity, without attention to which, the result cannot be satisfactory.

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THE EXHIBITION OF FLORISTS' FLOWERS IN POTS.

WE recently inserted an article from Mr. Glenny, on the subject of growing Pinks in pots, to which we ventured to append the question: "Why not show them in pots also?" Since then we have thought over the matter, and we see no just reason why Carnations, Picotees, Pinks, Heartsease, and even Tulips and Ranunculuses should not be shown in pots as well as Auriculas and Polyanthuses. We are quite prepared for the outcry of "impossible," "nonsense," and similar exclamations from those who are either too conceited, or too indolent to try; but we recollect the outcry about Roses being shown in pots; some of the largest growers were convinced they could not be grown, or if grown, it would be impossible to carry them to any distance, but how futile have such predictions been proved, for it is found as easy to grow and carry Roses one hundred miles, as one mile; and hence, especially at early exhibitions, they have become one of the leading features of attraction. Carnations and Picotees are for the most part grown in pots; Pinks we have the evidence of thousands annually produced in Covent Garden Market, can be grown in the same way; then why not exhibit them as grown? It may be true that to grow them in the greatest perfection, only a few flowers should be kept upon each plant, and that some of the best kinds are inconstant, and occasionally produce flowers unfit for exhibition. To this we can only remark, skilful cultivation will make a great difference, and if such cultivators as Turner and Bragg, of Slough; Ward, Norman, and Newhall, of Woolwich; Wilmer, of Sunbury; Keynes, of Salisbury; Wood, of Nottingham; and many more growers in all parts of the country who might be mentioned—if these growers could only be induced to take the matter in hand, and devote their skill to the subject, we have no doubt they would soon show florists' flowers in as great perfection as other flowers.

Of Heartsease it is scarcely necessary to say a word, the most successful exhibitors have long grown them in pots, in cold frames, finding that system the most convenient and certain for the production of first class flowers, and nicely grown in six-inch pots, they would certainly form very attractive objects, while the facility with which the flowers could be examined, and their constancy proved, would render them much more extensively cultivated than they are at the present time.

Pinks in pots of the same size, in twelve or twenty-four distinct kinds, each plant carrying from six to a dozen flowers, would be very interesting, and Picotees and Carnations in the sized pots they are usually grown in, would be still more attractive. We may be told they would not carry a "head of bloom," by which is meant a quantity of flowers at the same bearing, but just the same thing was said of Roses, and yet in what magnificent condition we annually see them. Let but the leading growers turn their attention to this subject, and imaginary difficulties will soon vanish. One great advantage of this system of showing, in addition to superior attractiveness, and not rendering the destruction of the flowers by cutting necessary, would be the certainty by which, in untoward seasons, they might be produced at the time required, as, by introducing the potted plants to the greenhouse, and keeping the Pinks in a close frame for a short time, no fear need be entertained but that they would be in perfect bloom at the proper time. This of itself would be a compensating achievment, as nothing can be more annoying to an ardent florist than to lose the opportunity of showing his favourite flowers after he has been at the trouble of growing them, for, though the compensation may be small, the pleasure and honour of gaining a prize is the same to all, and is a stimulus to perseverance which mere pecuniary reward can never impart.

Tulips and Ranunculuses would be more difficult, inasmuch as pots of an appropriate size would not hold sufficient soil to support the plants, but these we fancy may be planted in terra cotta vases, or ornamental boxes, in sixes, twelves, or twenty-fours, and so would be admissible. We do not, however, contend so much for these, as for flowers of a more durable character. We have a great objection to cut such, and as a great admirer of Carnations and Picotees, would rather see an exhibition without the flowers, than have them cut. We commend these remarks to the attention of the Exhibition Committees of the Horticultural, and Royal Botanic Societies, and if either society should feel disposed to carry our suggestions into practice next year, we shall be ready to place at their disposal, for the best twelve dissimilar Picotees shown in July, in eleven-inch pots,

First prize	Gardeners' Magazine of Botany	2 vols.
Second do.	do. do.	1 vol.
Third do.	Florists' Guide	1 vol.

While on the subject of exhibitions, we may remark, a rumour is afloat that the Horticultural Society have in contemplation an autumn exhibition of Dahlias, &c., at Chiswick, at a reduced admission, the Duke of Devonshire's garden being thrown open to enhance the attraction. The expense of such an exhibition would not be great to the society, while the good it would do in bringing permanently into notice plants suitable for autumnal decoration, but at the present time but little known, would be immense, to say nothing of the stimulus it would give to the cultivation of Dahlias, Perpetual Roses, and autumnal flowers generally. When we hear more, we shall recur to the subject; and we most heartily wish the Society success in any such effort.—A.

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PREPARATION OF CARNATIONS AND PICOTEES FOR EXHIBITION.

By Mr. G. GLENNY, F.H.S.

THERE is no flower that more requires artificial aid than these very beautiful subjects. They are totally helpless, as it were; there is no strength in the base of the petals, which are mere threads, supporting broad flat blades; the bunch of threads is in the calyx round the seed vessel, and the enlarged ends, which form the expanded blossom, burst the calyx and develope themselves in the most imperfect and confused manner. Strange as it may appear, the outer or large sized petals are often in the centre, and the small petals that should appear in the centre are outside; and nine times out of ten the calyx would be split all the way down on one side, and not opened on the other. The only way to counteract this is, first to tie the pod or calyx round the middle when the bud is nearly full grown, but before it splits, and, having tied it firmly, wait until the calyx begins to open at top, and then tear down the five pieces to the tie all round alike, because that enables the petals to develope themselves properly.

But although the petals which are crowded in these pods will develope their individual beauties, they require to be dressed as it is called, that is, the petals all brought down into their proper places, for the thread-like bases of them will pass one another, and therefore the guard or broadest petals may be brought down to the outside, and the narrow ones guided to the centre. The greatest care is necessary in doing this, so that the petals be not bruised in the operation. But although thousands of flowers are dressed after they are cut, the work should begin earlier. As soon as the petals begin to develope themselves, the broadest should be carefully brought down to the outside, to form the lower row or dish, as it were, of the flower, and these should be a complete circle. As the others come forward, the next largest should be brought down and placed with the centre of each in the place where the others meet, and lap over them; the third row should be placed on the joins of the second row, and even a fourth on the joins of the third, if there were any. During all this time the expansion or growth of the petals to their natural size after they are placed, completely sets them fast in their proper places, and they would travel for hundreds of miles without getting confused; but on the other hand, if neglected till the petals are full grown, and they are then dressed at the last moment, they will not hold in the places you change them to, and the flowers never can be so perfect.

The mode of dressing is to take hold of the broad part of the petals with a pair of smooth flat tweezers, generally made of ivory, bone, tortoise-shell, or wood, and not pinching them too hard, hold the petals tight between them, and, by a gentle twist, guide them carefully where it is wanted to make them lay. It is usual to cut a hole in the centre of a card, just large enough to let the pod of the bloom half-way through it; this card is cut quite round, and the flat back of the flower should be brought down to the card while young, the petals being brought down in a complete circle; the card keeps the petals from reflexing, which they frequently will when neglected, and when once grown so, scarcely anything will bring them flat again; whereas, when placed flat while growing they never show any disposition to go back. It is obvious that the flatter the lower large petals lay, the larger will be the flower; and the more uniform the rest lay the better.

With regard to the choice of sorts for showing there is not sufficient pains taken; we frequently see five or six in one class shown in a stand of twelve. This cannot be right. Two of each class make a splendid stand—that is, two pink and purple bizarres, two crimson bizarres, two scarlet bizarres, two purple flakes, two scarlet flakes, two rose flakes; and these ought to be placed uniform, as for instance four of the brightest of the bizarres at the four corners, and rose flakes at the end of the middle row; the two other bizarres should be side by side on the middle row, and the pair of flakes above and below them. Proper attention to these trifles often makes such a first impression on the minds of the judges that they cannot resist the temptation to place stands so arranged higher than they really deserve, the uniformity giving such a striking advantage as would hardly be credited. It looks perfectly ridiculous to see the numerous stands placed for exhibition with two many flowers of one class, and none of others; there is a flatness which nothing compensates for, and the managers of exhibitions ought to stipulate that there shall be two of each class, in the same way that they do who say that there shall be an equal number of each class of Tulips. Common sense tells us that it should be so with all collections of class flowers, and in Tulips it would be observed if there were nothing said. How then the showers of Carnations should be allowed to overturn all the ordinary rules of showing we hardly know; but of this we are certain, if any one exhibitor will take pains to attend to our suggestion, he will find the arrangement greatly help his stand.

Picotees are prepared in the same way as Carnations; and the remarks we have made as to uniformity of arrangement in the stands are equally applicable in their case also.

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THE CULTIVATION OF THE CINERARIA.

By Mr. H. ROSIER, Brooklands Nursery.

WHERE is there a plant, which, during the autumn, winter, and early spring months, is so gay and beautiful as the Cineraria? or which is so useful for exhibitions or decorative purposes, or for the embellishment of the flower-vase or bouquet? By artificial light the colours of some of the crimson, rose, and purple varieties are extremely brilliant, while the white varieties, margined with the preceding colours, are matchless. Add to this, that many of the kinds are deliciously fragrant, and you have nearly all the qualities which constitute a perfect flower. During the season, a number of very fine seedlings have been brought under the notice of the public, some of them of remarkable excellence and beauty, the most remarkable of which have been noticed in previous articles. In treating of the Cineraria as a plant for decoration, or of its value for exhibition purposes, where, in the early part of the season, the various kinds make a fine display, we cannot refrain from stating that their cultivation might be much improved, and, indeed, must be before they will assume their wonted standing upon our exhibition tables. But a few years back, Cinerarias were a poor lot of starry things, with narrow flimsy petals, and flowers supported by tall unsightly stems; but now, thanks to the desire for improvement, the best varieties are dwarf and compact, and, when properly grown, produce perfect trusses of stout, and, in some few cases, of almost perfectly formed flowers. In treating of this plant, when high cultivation is aimed at, care must be taken to keep the plants healthy at all times. If intended for exhibition, you should, about this time, choose strong plants from those previously potted, closely observing that they are in a perfectly healthy state; for without they are so, no skill of the cultivator can make them grow into good specimens. Supposing them now to be in three inch pots and well rooted, a liberal shift may be given, say to five-inch pots, in a good rich compost, prepared of good turfy loam, well decomposed cow-dung, adding a little leaf mould and silver sand to keep the soil open, bearing in mind that proper drainage is the most conducive of all to healthy growth. When well rooted, after this first shifting, stop them, that is, pinch out their leading shoots, and when they have made fresh growth, look carefully over them, and take out the small and weakly shoots and part of the old leaves, so as to admit the air freely. Place them thinly close to the glass in the front of a greenhouse; or, I have seen them grown equally well in cold pits, or frames raised on pots to insure a free circulation of air among them. This will, in a great measure, prevent the mildew, to which they are very liable through the winter months; but should it appear, take black sulphur and put it in a piece of muslin, or a pepper-box, and dust the infected leaves. If strong enough, and well rooted when housed, you may then give them a second shift, deferring the final shift until February, when a stronger compost must be used, adding, if possible, a little well decomposed night soil, or, if this is not attainable, a portion more cow-dung. Do not be too free with leaf mould this time, as they require the soil more binding, to retain the water, as the warm weather advances. Continue to thin out the small shoots and superfluous leaves, to throw the whole of the sap to the leading shoots. Stake them as soon as long enough, and tie them out as wide as possible, as the side branches will fill up the intermediate spaces. Fumigate them occasionally to prevent the green fly, which is a great pest, bearing in mind, that prevention is better than cure; for if insects are allowed to gain ground, it detracts much from the beauty of the plants. When the plants have filled the pots with roots, liquid manure may be given with great advantage, as it will make the leaves have a deep green and healthy appearance, and add to the brilliancy of the flowers. Seeds sown in the middle of July, or beginning of August, and the plants, when large enough, pricked off into store pots, to give them strength previous to potting into separate pots, make strong plants for spring purposes, and may be treated in all respects the same as the show plants, with the exception of stopping, which causes them to flower later; but this may be necessary when late flowers are required. When the plants go out of bloom in the spring, if seed is not wanted, remove the flowers at once, but take care to retain the leaves to draw the sap, and so soon as the weather is suitable, place the pots in a shaded situation, watering them slightly, and taking great care to keep them clear of insects. Here they may remain until August, at which time a quantity of young plants will have started from the old root. Then take and part the old plant, carefully shaking it clean out, pot the young plants separately, retaining the smallest portions, as every branch with an atom of root, will, under proper management, make a specimen before the end of the season, the large plants flowering first, and the small ones in succession. Old plants of the common kinds may be planted out in the spring, and these may be taken up again in August, parted, and the plants planted out again, shading them of course for a short time until they are established, and these, if potted in October, before the frosts destroy them, will make splendid plants.

Seedling Florists' Flowers.

THE flowers of the month have been numerous—too numerous to be good—and consequently a great number of really contemptible productions have been produced, and, we are ashamed to add, have been rewarded. At Chiswick, on July 13, was a collection of Petunias, remarkable for nothing but want of form, substance, and colour, in fact worthless weeds, which no one of any pretensions to judgment would think of harbouring for a day, yet those very plants received a *silver Banksian medal*, and doubtless next season will be sent out as having been so rewarded. Again a *collection* of seedling Antirrhinums received a similar reward, and though several of them were very pretty, the majority were unworthy of such distinction. Nothing can be more injurious to gardening than these injudicious rewards—they are the means of foisting worthless things upon the public, to the disgust of the amateur and the injury of the fair trader. Messrs. Mayle and Co.'s Model Fuchsias, as far as we have seen of them, are worthless, and must be grown very differently to be worth cultivating. Report says that Foster's "Gipsy Rival" Pelargonium, which took an equal second prize at the Pelargonium Show last month, having proved inconstant, has been broken up, and consequently will not come out; but this report, we have reason to believe, is erroneous. The only two Fuchsias we have seen worth notice are Mr. Turner's Banks's Expansion, a light flower of great purity and good habit, and Smith's Sedonia, a reflexing flower with dark corolla, which might be grown into tolerable condition. Seedling Carnations and Picotees have been shown by Mr. Turner. May's

Antonia and Romeo, rose flakes, with good white, are both promising, and Puxley's Mars is a scarlet flake of great beauty. Of Picotees the best are Matthews' Juno, Dodwell's Mary, a red edge, and Alfred, purple. These we hope to see again upon the plants.

PELARGONIUMS.

Nectar Cup (Hoyle).—Bright rose, with dark clouded blotch, and pure white throat. Fine habit, and very free.

Inez (Hoyle).—A deep salmon-coloured flower, with black blotch, the upper petals rather crumpled. Tolerable habit, but shy.

Camilla (Hoyle).—A rich chocolate upper petal; under bright rose, with white throat. Moderate truss, good habit.

Chieftain (Hoyle).—Deep rosy crimson with very dark spot. Moderate truss and good habit.

Ganymede (Hoyle).—A light purple flower with chocolate blotch. A nicely cupped flower, with good truss and habit.

Milk-Maid (Beck).—White; the upper petals blotched with claret. Tolerable form, good habit, and free.

Diadem (Beck).—A rather loose purplish crimson flower, with black blotch. Moderate habit and free.

FANCY PELARGONIUMS.

Desirable (Gaines).—A light lilac pencilled flower of rather tall habit, but free.

Circularity (Gaines).—A beautifully-formed mulberry-coloured flower, belted with white. Small, but free, and of good habit.

Optima (Ambrose).—A fine crimson flower; lower petals spotted with the same. Fine form and free.

Angeline (Ambrose).—Upper petals crimson on a light ground; under petals spotted with crimson. Moderate form and free.

Goliah (Ambrose).—Rich mulberry upper petals; under spotted with same colour. Fine form but shy.

Enchantress (Ambrose).—A delicate lilac flower, spotted with the same. Moderate form, very free bloomer.

Annie (Ambrose).—Upper petals rosy crimson; lower spotted with the same colour. Very free bloomer and good habit

Richard Cobden (Ambrose).—A very dark mulberry-coloured flower, of good habit, with white throat, and very free.

Eclipse (Ambrose).—A very rich plum-coloured flower, of fine form, but shy.

Miss Wright (Ambrose).—Bright rose upper petals; lower spotted with the same colour. Moderate form; free.

Fascination (Ambrose).—A pretty lilac and rose colour; belted with white. Moderate form and free.

Resplendens (Ambrose).—Upper petals bright rose; under petals clouded rose, with white throat. Moderate form and free.

Crimson King (Ambrose).—A rich crimson flower, shaded with violet; lower petals light crimson, shaded with lilac. Good habit; moderately free.

Bedouin (Ambrose).—A lilac rose-coloured flower, shaded with purple, and white belt; lower petals clouded violet. Good habit; free.

Duchesse d'Orleans (Ambrose).—White, with deep rose spot. Good habit, moderate form, and free.

Erubescens (Ambrose).—A very slight improvement on Modesta, but too much like that flower.

Eclipse (Ambrose).—The same grower's Defiance in miniature.

Reine des Fleurs (Henderson).—An improvement upon Jehu Superb. Moderate form, very free, and good habit.

General Jung (Gaines).—Deep mulberry, belted with white. Good form, and very free.

Black Prince (Henderson).—A very rich chocolate flower. Very novel, good habit, and free.

Electra (Ayres).—Crimson purple, shaded with lilac, and belted with white. Very free, and robust habit.

Kentish Beauty (Ayres).—Very rich crimson, shaded with violet, and belted with white; lower petals deeply belted with crimson. Fine form and habit.

Painted Pet (Ayres).—Purplish-crimson, shaded with violet, and white belt; lower petals spotted with purple. Good form, very profuse, and novel.

Conspicuum (Ayres).—Upper petals purple, blended with crimson, and distinct white throat; lower petals belted with purple. Fine bold flower, very free.

Albonii Superb (Ayres).—Upper petals rich violet crimson; lower pencilled with rosy purple. Good habit, and very free.

Miranda (Ayres).—Pencilled rosy salmon, shaded with lilac; lower petals pencilled with rosy purple. Moderate form, fine habit, and distinct.

Enchantress (Ayres).—Upper petals very rich mulberry, belted with white; lower petals flesh, deeply spotted and pencilled with mulberry. Fine form, and habit, free.

Ole Dan Tucker (Ayres).—Upper petals nearly black, with light centre, rather puckery. Tolerable form, and good habit; singular.

Purity (Ayres).—Upper petals delicate lilac, belted with white; lower petals white, spotted with lilac. Fine silky texture, and of good form and habit.

Celestial (Ayres).—A very large flower, with rosy purple upper petals, shaded with violet, and belted with white; lower petals marked with rosy purple. Moderate form, fine habit.

THE GARDENERS' AND NATURALISTS' CALENDAR FOR AUGUST.

FLOWER-GARDEN.—IN-DOOR DEPARTMENT.

Conservatory.—Flowers are so abundant in the open garden that so great a profusion in the conservatory would be in bad taste, therefore take the advantage to allow the established plants plenty of room, and a free circulation of air. Water copiously those plants planted in the borders, especially Camellias and Acacias, but guard against starting the first-named into a second growth, which would materially deteriorate their blooming. Sprinkle the borders slightly twice a-day, and syringe the plants twice or thrice a-week. Train climbers, and prune such as require it; but avoid formality, as they look much more graceful hanging in festoons from the rafters than when closely tied in; besides they generally flower more freely when so managed, as nature, more especially as she manifests herself among climbing plants, does not like too much restraint. It is a singular fact, but nevertheless true, that many climbers may be trained until they will not produce a flower at all, whereas, if left to nature, they would bloom in wild profusion. The "why" of this is worthy the illustration of some of our scientific friends, and perhaps our *practical* brethren could throw some light on this subject. At this season, articles of *vertu*, as statuary, vases, &c., may be introduced into the conservatory with very good effect, and will make an agreeable and interesting change until the plants are again removed to the house.

Orangery.—The fruit will now be swelling fast, and therefore encourage it as much as possible, by copious syringing, a brisk growing temperature, and plenty of manure water. To this end, the house should be shut up early in the afternoon, say three o'clock, but a little air must be admitted towards nine o'clock, to allow the steam to pass off freely. Oranges, indeed Citrus fruit of all kinds, to be good must be grown quickly while swelling, or the peel will become thick and the eatable part woolly and destitute of juice. This is a good time to propagate Oranges by grafting. They take freely if placed in a close frame upon a gentle bottom heat. The ripened wood of this year must be used for grafts.

Routine.—Look well to Roses and other plants in pots intended for early forcing, and take care to get the wood thoroughly matured, for upon that much of the success of early forcing depends. Plants of Weigela rosea, and Forsythia viridissima, should be fully exposed, and kept rather short of water. Both are excellent plants for forcing, as are also the new Ceanothuses.

A.

Orchid House.—Much of future success depends upon the treatment the plants are subjected to at the present time; it is therefore of the utmost importance that due care should be bestowed upon them to keep them clean, and also in order to secure full and perfect development. Air freely, shade thoroughly, and water copiously.

Stove.—Let all young growing stock be properly looked after, re-pot any that may require shifting, and stop all such shoots as require it in order to form strong bushes. Pay due regard to staking out, in time to prevent weak growth. Use weak liquid manure freely to all fast growing plants; ply the syringe liberally, but with care; saturate thoroughly all parts of the house daily, give abundance of air day and night; keep all neat and clean. Let all plants in blossom be nicely and prominently arranged. The best place for all bulbous and tuberous rooted plants, after they have done flowering, is a cold frame. Keep them clean, and dry them off cautiously.

J. G.

GREENHOUSE HARD-WOODED PLANTS.

PRESUMING that a sufficient quantity of soil of different sorts is already carted in, let the rough vegetation be chopped off, and put it up into compact heaps, narrow at the top, in the form of a hay-stack, in order to exclude the rain.

Many of the strong-growing plants, such as Diosmas, Epacrises, Coleonemas, &c., if now standing in a shady situation, should be removed to a bright sunny place, so that the wood may get well ripened, which will cause them to flower freely next season. Proceed with the shifting of Aphelexes, or any other of the later flowering things, and guard them carefully from too much wet. Attend to the young stock in pits and frames as recommended last month, but gradually dispense with the shading, until they can do without it altogether. Should any of the Boronias, or blue Leschenaultias (which should always be left in the greenhouse) seem to want stopping, let it be done early in the month, for if stopped too late they will not flower next spring.

Azaleas.—Get on as fast as possible with the training of these, so that the foliage may draw out properly before winter. Shift any of those that were in flower late, look well after thrips, and fumigate on their first appearance. Give the specimens intended for flowering all the sun and light the house affords, and admit the air freely amongst them. Any young plants that it is desirable to increase in size should be kept warm and moist, with slight shading in bright weather.

Camellias.—Finish the shifting as soon as possible. When they have rooted a little into the new soil, give them plenty of air day and night, and syringe them freely three or four times a-week if the weather is fine. Daphne indica, both the white and red varieties, and Magnolia fuscata, are very nice things to have amongst the Camellias. They do well with the same treatment in every respect, and being sweet-scented, no greenhouse or conservatory ought to be without two or three plants of each.

J. F.

Heathery.—Remove the flowers from the plants so soon as they get shabby, and shorten back such growth as it is necessary to curtail, so as to form compact handsome plants. When they break and begin to grow freely such as require it must be repotted, observing the rules which have been explained in former Calendars in performing that operation. Place the plants in a sheltered situation where they will be shaded from the mid-day sun, and keep a sharp look-out for mildew, which otherwise would play havoc in a few days. Guard against heavy rains, and if they are continuous lay the plants on their sides to prevent their balls becoming super-saturated. Early blooming kinds, as aristata major, depressa, Hartnelli, mirabilis, Patersoniana, and other varieties which are growing freely, should be placed in the full sun to ripen the wood and set the bloom for next season. Protect the pots by plunging them in larger ones, but let the plants have the full sun. Young stock must be looked to. Some of it will require another shift, and early flowering kinds, as gracilis, hiemalis, tressula, and Sindryana, must have full sun to mature the growth and get early bloom.

W. P. A.

GREENHOUSE SOFT-WOODED PLANTS.

Pelargoniums.—Remove all plants which have gone out of flower into the open air, in an exposed situation, that they may ripen their wood preparatory to being cut down, which operation should shortly be performed, cutting them to within two or three eyes of the bottom, unless large plants are required, when the branches may be left a little longer. Give but very little water until they have broken, but sprinkle them over head occasionally, which will cause them to break more strongly. When they have grown about half-an-inch, shake them clean out of the old soil, prune the roots, and re-pot them into small pots, using a good rich compost; shade them for a few days, until they get established, when they may be again exposed to the open air. Water liberally as long as the weather keeps warm and dry.

Put in cuttings of those kinds required for stock. Sow seeds of the better kinds as soon as ripe. Keep them moist until they vegetate, and as soon as large enough pot into separate pots. Pick off the flowers and seeds from the fancy varieties, which will cause them to throw out shoots for cuttings. These should be treated much the same as the other varieties, unless the autumn prove wet, when they should be removed into a house for protection.

Calceolarias.—Those which have gone out of flower should be removed to a shady border, where they will throw up suckers, which, when large enough, should be taken off for cuttings. Place these in well-drained pots, in a sandy compost, under a hand-glass or frame, in a north situation, and look well to them, as they are very liable to damp off. As soon as large enough pot into separate pots, in a light rich compost. Sow seeds in light soil, cover slightly, and keep them moist until they vegetate. When up water carefully, or they will damp off.

Cinerarias.—These are now throwing up their suckers, which, when large enough, should be taken off and potted into separate pots, in a good rich compost. Place them for a few days in a cold frame in a shaded situation. When established, water freely. Seeds may now be sown for spring flowering. As soon as large enough prick off into store pots, where they may remain until they are fit to pot into separate pots.

Chrysanthemums.—Give these every encouragement to promote free growth. Thin them, and tie out and water liberally. Should the mildew appear, dust them with sulphur. A shady situation with a free current of air will be found the best place for them. Take off from the stools those layered early. Pot them and keep them shaded and close for a few days. When well established expose them to the open air.

Routine.—Turn over occasionally the heaps of manure and compost, that they may get well sweetened for autumn potting. While in a dry state, house those ready for use; wash dirty pots that they may be ready for use, for much mischief is done by potting in dirty pots.
H. R.

FLOWER-GARDEN.—OUT-DOOR DEPARTMENT.

The advantage of decided coloured flowers for massing purposes in our flower-gardens is at no time of the year more obvious than at the present season, when all the beds are full; for that simplicity, which is ever associated with beautiful objects, can be seen at once, not only in the individual masses, but also traceable in and out amongst the whole of the beds, enabling the eye to embrace the effect of the entire arrangement, without any apparent effort either near or at a distance more remote. It is by having each bed sufficiently marked with a decided colour, that we get a general expression of character from the whole, which in truth makes our flower-garden system an art. The clean, simple, and intelligible colours, and the regular and well-connected figures, are what look best in geometrically laid out flower-gardens. Leave the loose and scattered, the rough and rugged, to nature's own scenes. A flower-garden, like everything else, which has the elements of progress bound up with it, cannot be long looked at without generating some new idea; and the thought of having a subdued colour for a central mass, in a regularly constructed flower-garden, is an idea in the onward direction, for it gives an enlargement and an expansibility to the whole figure beyond what it really possesses, whereas the effect of a warm striking colour would have been to contrast and diminish the real size of the figure. There is a great and a small system of laying out beds on grass, at what is called apparently irregular distances, so as to be connected with groups of trees, and which catches the eye at different turns, in consequence of the contrast that exists amongst the colours of the beds. The great system is distinguished by a number of large circular beds being associated with smaller beds, but at sufficiently marked distances from each other to make the arrangement clear, and set off the individual beds; while in the small system there is little observed, but an excess of small beds not much varied in size, form, nor colour. Indeed it may with truth be said of the small system that it chiefly exhibits a degree of small prettiness, at all times to be avoided in our flower-garden arrangements. Dignity is the characteristic of the one, and meanness that of the other. Alyssums, Iberises, and other like plants, just rooted, should be planted out in the reserve garden, ready to be removed when wanted in the autumn to fill up beds.

Propagation.—Cuttings of Geraniums may be thinned out of the beds here and there, without much injury to the masses, and laid in on a border, putting a little silver sand in the opening made to receive the cuttings; by no means exclude the sun's rays from the cuttings. In this way there is no danger of the chemical action without, overcoming the vital action within the cutting, as is too often the case when the same cuttings are put in a close frame. Petunias intended for winter stock should be increased by cuttings at once, so as to have them potted off and the pots full of roots before the winter sets in. Anagallis, Nierembergias, Maurandyas, and Lophospermums may all be rooted in sandy peat, if placed in a close frame, and shaded in bright sunny weather. Maurandya Barclayana rosea is not a decided colour, but it is an abundant flowering variety.

Sow intermediate Stocks immediately, and ten-week Stocks of various colours twice before the middle of the month. Prepare a situation for sowing annuals, to stand the winter, next month.
J. C.

Rose Garden.—Give a plentiful supply of water to all perpetual flowering kinds if the weather continues dry. Mildew will now begin to show its white spots on some of the sorts, and it must be checked as soon as seen, by syringing the plant with soft water in the evening, and dusting the infected parts with sulphur.

Those in pots must have constant attention to keep them growing, and mind they do not stand crowded together. Budding should be finished as early in the month as possible, the stocks being kept well watered till they are budded to keep them growing.

Towards the end of the month the first budded ones may have their bandages removed, and see that none of the wild shoots lay across where the buds are inserted, or, by the winds moving them to and fro, they will get injured if not entirely destroyed. Cuttings of the Tea-scented, Noisette, China, Isle de Bourbon, Hybrid Perpetuals, &c., may now be struck very easily in a gentle hot-bed in very sandy light soil. As soon as they are rooted they should be potted off, and put in the hot frame again for a few days till the roots begin to show at the sides of the pots, when they must be removed to a cold frame and hardened off. During the latter part of the season, they must be exposed to all fine weather.

Banksian Roses should now have their young shoots nailed in, or if there are too many to nail in, the superfluous ones should be taken off.

The Ayrshire, Boursault, Sempervirens, and other pyramid Roses will frequently send out very luxuriant shoots, particularly near the bottom, which, if not wanted, to renew any weak part of the plant, must be taken out altogether, or the tops taken off to prevent their robbing the other parts of the plant.
H. M'M.

Arboretum.—With this month I close the list of Coniferæ, as it contains such as I would recommend for amateurs and the proprietors of small places, who only wish to plant a limited collection. They are all proved, and will not entail disappointment. Amongst the many novelties introduced of late years there are, no doubt, some beautiful things, but any remarks on them would be out of place here, my object being to recommend to those who may require a guide, a few proved good things.

Picea Webbiana (Nepaul, 1822), the Blue Coned Pine of Almoran.—The foliage of this variety being very large, with the upper surface of a deep green, and the under as silvery white, it is one of the finest of the genus;

the habit of the tree is good, and the cones are very beautiful.

Picea Pinsapo (Spain, 1838).—A rapid growing and fine distinct species, its rigid habit and stiff bristling leaves contrasting admirably with the more drooping kinds.

Picea nobilis (N. America, 1831).—The habit of this tree, under circumstances favourable for its healthy development, is so wonderfully regular and beautiful, that it ought to be admitted into the most limited collection.

Picea Fraserii (N. America, 1811).—A very elegant species, symmetrical and erect in habit, foliage small and thick, with a glaucous appearance. Worthy a place in a limited collection.

Araucaria imbricata (Chili, 1796).—The Chili Pine although so long introduced, is only just beginning to be well known. It is certainly one of the grandest plants known. It likes a deep loamy soil, cool, but well drained.

Cryptomeria japonica.—This rapid growing Conifer, one of Mr. Fortune's importations from China, is fast gaining the good opinion of all admirers of a graceful foliage and a pleasing habit of growth. It is considered likely to attain an immense height, and certainly present appearances seem to render it not improbable. Being quite hardy, it should be in every collection.

Shrubbery.—In this department much ultimate good may be effected by going over the hardier and most luxuriant evergreens, and pruning off their exuberant branches, particularly in places where they are likely to encroach upon the well-being of such plants as they are intended to foster; this not only reduces them to their proper office, but also by close cutting they are kept dwarf and full, consequently handsomer specimens. A due attention to watering, and keeping down unsightly objects, are still the routinal operations in these departments. J. C. R.

Carnations and Picotees should now, without loss of time, be layered; but avoid in all cases the old system of shortening the grass. Where seed is required the decaying petals should be picked off, as a preventive of damp injuring the pods; but where seed is not an object, the flower stems may be cut down. See that the layers do not suffer for want of water, and keep clear of weeds, slugs, worms, &c.

Dahlias.—The first planting of these now require constant attention to watering, tying out the lateral shoots, removing those that are superfluous, examining at all times the previous fastenings, as the rapidity with which they swell at this season will cause them to become too tight, even were they only tied a day or two previously. Persevere in the destruction of earwigs before the coming shows, that there may be nothing to mar the flowers. The soil should be frequently stirred, not deeply, but often, as nothing tends more to the production of good flowers than good growth, which is greatly assisted by loose soil. Seedlings should be looked over daily, throwing away single and semi-double ones, except they possess some new colour, or peculiar good form. I would by no means recommend a perfect clearance to be made, as it frequently happens that our best sorts will give only imperfect flowers the first part of the season; it is, therefore, but reasonable to expect the same of seedlings, so if they are not intruding on the space of a known good one, wait the event of a second flower before they are quite condemned.

Hollyhocks.—Continue to secure to the stakes as they advance in growth, watering and stirring the soil as they require. Seedlings should be examined and thrown out, as they are found to possess no superior claims, while those of promise should be attended to, and cuttings struck therefrom. Those from spring sowing should have the hoe frequently passed through them.

Pansies may still be increased by cuttings, and those previously struck should be planted, taking the advantage of weather suitable for the operation. Should the weather be dry they must be watered until they are established. Gather seed as it ripens, and sow when ready, which, if done during this month, will be in time to stand the winter. That gathered after will be better kept till spring.

Pinks.—Pipings of these that are now rooted should be planted into store beds to strengthen previous to planting them in their blooming quarters. A further supply may still be struck. Examine the seed pods, and collect those that have been hybridized or possess the greatest requisites, viz., smooth rose-leaf and long pods.

Polyanthuses may now undergo a regular examination. The old plants are giving ripe seed, which should be gathered. The plants should be taken up, divided, and replanted, selecting a partial shade, such as, or as nearly as can be, the wild primrose most luxuriates in.

Seedlings should be planted as the weather suits the operation, regard to which should be considered rather than particular days or even weeks. Attend to the watering of these and the divided ones as they may require, keeping clear of weeds, slugs, &c.

Ranunculuses and Tulips, now in their boxes and drawers, require to be examined occasionally, which, if only to change the air, is of great service in keeping away damp, &c. T. B.

FRUIT-GARDEN.—IN-DOOR DEPARTMENT.

Fruiting Pines.—As the principal summer crop will only require casual attention in maturing, &c., attention should now be directed to the crop advancing through their several stages for the autumn supply; these, to fruit in perfection, ought to be in a house by themselves. Premising that all have been shifted and bottom heat is genial, water will now be required often, keeping the house damp by often repeated sprinkling of the floors, and a general syringing in the afternoons when the house is closed, will add much to the vigour and health of the plants. It will be advisable, however, to avoid damping those plants in flower, as it often produces decay of the internal seed cells, and renders the fruit worthless.

Succession Plants will require an increased allowance of water and air, as they are now making their most vigorous growth. The remainder of the plants for fruiting next year may now have their final shift. Stock on the Meudon plan must be watched, the bottom heat kept carefully steady, and large supplies of water often applied over head; we would not advise much shading after this time, as the principal object is to get strong stocky vigorous plants, and it will now require all the solar light possible to mature their growth sufficiently for the plants to have a rest. The suckers from the present fruiting plants should now be potted and placed in a close frame or pit; these will produce fine plants next season. As the Providence and Cayennes are shy at producing suckers; take the stools, shake them out, removing some of the lower leaves, repot them and place them in a good heat, they will produce good suckers by the spring.

Vinery.—Towards the end of the month the sashes may be entirely removed from the early house, provided the wood is perfectly ripened. Give the sashes and wood-work a coat of paint, when all will be in readiness for commencing in the autumn. Where Grapes are now ripe, or ripening, care must be taken to prevent the inroads of the red spider, which, otherwise, will make sad havoc this dry weather. A washing of sulphur and lime over the walls and pipes is the only preventive that can be applied at this stage of the crop, but directly the crop is cut, use the engine freely to clear them, and allow the leaves to keep their colour. Thin the last crop, which should be the St. Peter's and Muscat. We question whether Grape-growers will not find in the Barbarossa an old and worthless acquaintance formerly called Prince Albert. So much for novelties. Vines in pots, having now completed their growth as to height, will require much attention in regular supplies of water; remove all lateral shoots and expose the primary leaves to the light. Directly the wood shows indications of ripening, reduce the quantity of water. J. S.

Figs.—The second crop of fruit will now be approaching maturity, and if the directions given in previous calendars have been fully attended to, the quality will be excellent, the fruit having grown and ripened under a great amount of solar light. Give all the air possible, use every means to keep clear of red spider, and water when necessary.

Peaches.—The wood in the early forced houses will now be ripe, which is known by its assuming a reddish colour, and by the leaves falling off when slightly touched. Still, the directions previously given must be attended to unremittingly, in order to secure its thorough maturation. Ventilate freely both day and night, but during heavy rain close the lights to keep the borders dry; give all the air possible from the front. We strongly advise that the borders outside the houses be also kept tolerably dry. As soon as the fruit is all cleared out of the late houses, every attention must be paid to ripening the wood.

Strawberries.—These should now be shifted into the sized pots they are intended to fruit in. We prefer eight inch pots, much of the success in forcing depends on the attention paid to the plants at this season, no pains should be spared to get strong, vigorous plants, with bold, well formed crowns—for then the principal end is gained. The best soil is good turfy loam with a fourth part of stable manure. When potting the plants put a little soot at the bottoms of the pots. When all the plants are potted set them in beds four or five feet wide, fully exposed to the sun, but do not on any account plunge the pots. I have invariably found them fill the pots with roots sooner when not, than when plunged, and this being the case the plants will perfect their crowns before the short days come on. M. S.

Cucumber House.—If there is any appearance of mildew on any part of the plants, it must, on its first appearance, be dusted over with sulphur, and every leaf that can be spared must be removed. Should cold nights occur slight fires must be applied, more particularly to the roots, as that will prevent, in a great measure, the gum in the fruit. The green fly must be well looked after, and repeated smokings for two or three successive nights will be the most simple means of getting rid of them. Previous directions, as to shade, air, and water, must be attended to.

Dung Bed.—Prepare one of these for a one-light frame, and towards the middle of the month sow for winter fruiting. Take care to keep the plants as clean as possible, and encourage them to make robust growth.

Melons.—The young growing succession plants must have strict attention; see that they do not suffer for want of moisture at the roots; keep the linings made up, but see that they do not become burnt and dry, they will want frequent stirring and watering. Previous directions for the matured fruit must be attended to.

W. T.

FRUIT-GARDEN.—OUT-DOOR DEPARTMENT.

A FEW words on packing ripe wall-fruit may be serviceable on the approach of the season of its ripening. In the first place secure a quantity of well beaten moss, or dried short grass from the lawn. Have a box sufficiently large to hold the quantity required to be sent in it, and of a depth to hold two tier of fruit; each tier to be separated by a false bottom, which must be secured when one layer of fruit is put in the box. Wrap each fruit in a piece of silver, or other sort of thin paper, and then place them pretty closely in a thick layer of the moss, or grass; fill up between the fruit with it, and place a layer over them of a sufficient thickness to allow the false bottom, or lid, when full, to gently press it down, so as to keep it tight, as this is one of the most important points in packing fruit. Cotton wool is sometimes used for packing, but is one of the worst materials that can be used for the purpose; as, in the first place it is difficult to remove from Peaches; and, in the next place, it has not that elasticity that short grass or moss have. I am in favour of short grass, having used nothing else for packing for several years.

Apricot.—As the fruit progresses toward ripening, expose it to the sun as much as possible to give it colour. Keep the shoots closely laid in, and when necessary a few leaves may be removed. When the fruit is ripe, suspend beneath the trees, on short stakes, nets or mats, to catch the fruit that falls. A little straw, or fern should be put in the nets or mats to prevent the fruit bruising. This is not intended to supersede gathering by hand, but to preserve those that fall from being bruised and spoiled; as, with the most careful attention, some will fall. To protect wall-fruit from Wasps, I have found nothing equal to Haythorn's Hexagon Netting, which admits a free circulation of air, and, at the same time, if properly put on the tree, will keep away Wasps and Flies.

Peach and Nectarine.—The laterals of the strong shoots that have been stopped, must be thinned to the number required to fill the allotted space, so as to allow those left the full benefit of the sun and air to ripen them. Should mildew appear, dust the shoots with sulphur. An occasional washing with soap-suds will be very beneficial to the trees if attacked by insects, but they should have intermediate washings or syringings with clear water.

Cherry.—The Morello on north walls, must now be covered with nets. This is a most valuable sort for late use. I have kept it on the trees until the latter end of November. As the fruit is gathered from the early sorts, take off the nets and give the trees a good washing with the engine.

Apple and Pear.—It may be necessary to support some of the branches that are heavily laden with fruit, therefore, the trees should be immediately looked to. Those against walls and espaliers may now be pretty closely stopped, as there will be little danger of the buds at the base of the shoot breaking after this time.

Fig.—Wasps are so exceedingly partial to this fruit that it is next to an impossibility to get a thoroughly ripe one, unless there is some means used to prevent their attacks. I have found nothing better for this purpose than common muslin bags, having strings to draw the mouth of the bag close. These should be put on the fruit just as they are ripening, and, as their period of doing so extends over several weeks, the bags will serve for several fruit in succession. Continue to stop the foreright shoots, and to lay in the main ones.

Gooseberry and Currant.—Those required for late use, must be protected by mats or some other material. The trees against walls may be protected with the greatest facility; and I know of no Gooseberry better for this purpose than the Red Warrington. I have kept it on a north wall, in a good state of preservation, until November. These trees had a frame-work of wood at the sides and top, which projected from the wall about eight inches; to this frame-work coarse canvas was nailed, both to preserve the fruit from wet, and to prevent the ingress of birds, wasps, and flies. Currants may be preserved in the same manner, but if kept long after they are thoroughly ripe, they become very acid.

Raspberry.—The canes that have just done bearing, may now be cut away, as well as the weak shoots of the current year, leaving only four or five strong canes if they are in stools; these shoots must be securely fastened to stakes. The canes of autumn bearing varieties must also be secured to stakes as they grow.

Strawberry.—No longer delay making new plantations, if fruit is required from them next year; if, however, it is inconvenient to do so immediately, and a crop is not regarded, the plants may be bedded out any time during the autumn, and then be transplanted to their permanent situation in the spring. Plants that have been forced in the spring, if now planted in the open ground will produce excellent crops next year. These plants will probably show flower in the autumn, but that should be cut off, as allowing them to remain to produce fruit would weaken the plants. Advanced as the science of gardening now is, I think it is scarcely necessary to caution my readers against cutting the leaves from the plant, as was formerly the general practice. H. C. O.

KITCHEN GARDEN.

Presuming that the principal breadth of Savoys, Brussels sprouts, Brocoli, Scotch and other Kales for autumn and winter use are completed, attention should be given to the spaces occupied with early Cauliflowers, Peas, and Beans, and as they are cleared of their crops, clear away the haulm, and prepare the ground for Coleworts, Spring Brocoli, or late crops of Celery, all of which will be found exceedingly useful, and should be planted as soon as possible.

Fork the ground between growing crops, and earth up as they advance in growth. The early crops of Celery should be examined before earthing up, and if they are infested by slugs, a sowing of lime or soot would remove the intruders. Sowings in the first week should be made of Wheeler's Imperial Cabbage, and a good piece of Prickly Spinach, to stand the winter. Strasburgh and Welch Onions, the former to transplant in the spring, and the latter for use in salads. Early Horn Carrots on a south border. Radishes, sown twice this month, in a similar situation, will give an autumnal supply. Small salads as noticed in former Calendars.

Cauliflowers in some situations should be sown earlier than in others; this is of the greatest importance. I have found a fortnight's difference in localities not more than 200 miles distant from each other, and would therefore recommend two sowings; the first to be made from the 6th to the 12th, the other from the 20th to the 26th. Endive and Lettuce should be transplanted periodically for succession. Herbs gathered that were not fit last month. Tomatoes, Gourds, &c., looked over, and all superfluous shoots removed. Prepare a piece of ground, by deep trenching and copious manuring, for Spring Cabbage, and keep it forked over regularly until the plants are ready to plant out. In some situations Onions will be ready to harvest; attend to them in time, and take care they are thoroughly matured and dry before they are stored away. Shallots and Garlic must also be attended to. Sow all spare ground with Turnips.

Clean walks, weed edgings, and have an eye to everything that will add to the neat appearance of the Kitchen Garden generally. J. C. S.

WILD FLOWERS OF AUGUST.

There is considerable occupation for the botanist in this month, as later specimens of the July plants are still abundantly met with, while the effect of the long period of summer heat, which has now passed over, shows itself in the maturation of the fruits of families in which the characters derived from them are of the highest importance, particularly the Umbelliferæ and Compositæ.

The less showy of Flora's subjects, the weeds, *par excellence*, such as the Docks (*Rumex*), the *Atriplices* and Goose-foots (*Chenopodium*), should now be sought after and carefully examined. Much confusion still exists respecting their distinctive characters, which depend chiefly on the condition of the enlarged perigone enveloping the ripe fruits; therefore, fully developed specimens, with their lower leaves and roots attached, should be selected for preservation.

With regard to botanizing, generally, in this month, it may be said that the later flowers will mostly be found in their prime during this month, while there are few to be marked as especially distinctive. Spiranthes autumnalis, the beautiful little Orchid, called, from its peculiar spiral arrangement of the flowers, "Ladies' Tresses," may be noted as belonging to August and September; also most of the Gentians, as *Pneumonanthe*, *amarella*, *campestris*, and on the mountains *G. nivalis*. On the sea-shore will be met with the various Glassworts, *Salicornia* and *Salsola*, the ashes of which contain such abundance of soda; also the autumnal Squill (*Scilla autumnalis*). The Ferns are now mostly to be found in fructification. A. H.

ANIMAL KINGDOM.

Ornithology.—August may be considered in the light of a holiday to many birds, and, as such, is of great advantage to those that are migratory; the business of incubation, with a few exceptions, is nearly if not quite over, and food being plentiful it enables the old birds to recruit, and the young to acquire strength, previous to the commencement of that long journey which, at stated periods, they are destined to perform.

At this time they lose a great portion of their shyness, and become constant visitors to our gardens, where young and old may be seen actively engaged in the capture of insects, varying their repast with an occasional taste of any of the smaller kinds of fruit that may still remain upon the trees. They are very interesting now and afford much amusement by the activity they display in the capture of their insect prey; the young are easily distinguished from the old by their more clamorous notes, and the difference some of them exhibit in their plumage. This is very conspicuous amongst the Willow Wrens (*Sylvia*), the young of which are far more gay in their colours than the old, the shades of yellow and green are very beautiful, which, added to their graceful form, render them objects of great attaction. Those that possess a garden of any extent, have no occasion to ramble to the woods at this season in search of objects worthy their notice, for they will see around them a host of little beings attracted together by the same cause—a plentiful supply of food; and who, in a few days, will be winging their way to far distant climes, as yet unknown to the greater portion of them. How strong must the impulse for migration be implanted in them, more particularly in the young, who, as yet, know of no other land but that of their birth, urging them onward over the ocean's trackless path and the deserts burning sands, encountering death in a thousand forms—for there can be no doubt but a vast number perish annually in these migrations.

The first to leave us are the Swifts (*Cypselus apus*), which are generally all gone by the 20th; but, in 1847, I saw two as late as the third of September; they make but a short stay with us, and are far on their journey while the Swallows and Martins are still busy in rearing their last broods. The Swifts have but one brood in the season, while the Swallows and Martins have two, and at times three. I have seen young birds in the nest of the Martin as late as the last week in September. There is something mysterious in this early migration of the Swifts, leaving us, as they do, in the midst of our finest weather. Is it that the food upon which they live fails them at this time, or is their other home so far away that it requires this early departure to arrive there at the proper season? One would hardly suppose it to be from the latter cause, for their flight is like that of the wind, and if the former, we should endeavour to discover in what their food differs from that of the other Hirunds; that there is a cause none can doubt, but what that cause may be is still to us a mystery.

The Swifts are the only birds that leave us this month, I think; but it is far more difficult to determine the exact time of the departure of many species than it is to note that of their arrival, you may miss them for a week when they will appear again for a few days as numerous as ever, but these may be birds that have been bred farther north, and which are actually on their passage.

H. W.

ENTOMOLOGY.—The continued heat of this month has its corresponding effects on the insect world, and butterflies, those true children of the sun, still abound. Our gardens, which, during the last month and the beginning of the present, have suffered, in the Cabbage tribes, from the attacks of the Caterpillars of the White Butterflies, swarm towards the middle of the month with fresh hosts of those destructive species *Pontia Brassicæ*, the large garden White, and *P. Rapæ*, the Green-veined White. *Papilio Machaon*, the Swallow-tail Butterfly, the finest of our British species, now also appears on the wing, but rarely, in meadows and meres. The Brimstone and Clouded Yellow Butterflies occur in woods and meadows. The Speckled Wood and Wall Butterflies (*Hipparchia Ægeria* and *Megæra*) also now frequent the borders of woods and sunny lanes, whilst various of the small beautiful Blues and Coppers are to be met with on heaths, commons, and especially chalky districts. Other species of Lepidoptera are also now to be found in the Caterpillar state, in fact, the latter end of this month and the whole of the next may be considered as the period for the second and last brood of Caterpillars. The larvæ of several of the species of Hawk-moths are now to be found, such as that of the Eyed Hawk (*Smerinthus ocellatus*), the Lime Hawk (*Sm. Tiliæ*), the Poplar Hawk (*Sm. Populi*), and the Privet Hawk (*Sph. Ligustri*); that of the Puss Moth (*Cerura Vinula*) is also now conspicuous on Willows and Poplars with its singular forked tail; whilst the Humming-Bird Hawk-Moth (*Macroglossa stellatarum*) delights us by its elegant flight, with long outstretched tongue hovering over flowers on well poised wings, and darting up on the slightest approach of danger.

Now also the Bee-keeper must watch his hives to see that the Honey Moths (*Galleria alvearia* and *cereana*) do not obtain an entry; this may, in a great measure, be prevented by making a careful survey of the exterior of the hives every evening just before dusk, when the Moths, if bred in the neighbourhood, will be seen hurrying about their outsides. Should this not be attended to, the Moths will gain admission, notwithstanding the vigilance of the sentry-bees, and their Caterpillars will subsequently prove very injurious to the comb, through which they burrow in all directions, not only spilling the honey and drowning or destroying the young Bee larvæ, but also many of the perfect Bees, which are covered with the overflowing drops of honey as well as entangled in the webs of the Caterpillars.*

In this month also (generally in the early part), a murderous scene takes place in the hive, and which is one of those singular traits in the economy of insect life, which exhibits the wondrous care of Almighty adaptation and knowledge in the highest degree. The main season for gathering honey is now past, swarming has been accomplished, the work of impregnation of the young queens has been effected, and the consequent presence of some two thousand individuals (nearly twice the size of the workers) in the hive, would be not only useless but highly injurious from their consuming so great a quantity of the honey stored up for the future supply of the community; but as there are only from ten to twenty young queens produced in the hive requiring the presence of so many males (or drones), and as it is known by various observations, that the lives of insects which have been prevented from pairing may be prolonged far beyond the natural period, it would hence follow that were it not for some extraordinary modification of instinct to suit the peculiar circumstances of the case, the vast majority of the male Bees would be a terrible burden to the community: to prevent this, however, Nature, or, more properly to speak, Nature's God has directed the worker Bees to kill these no longer needed individuals, and the sight which now presents itself is most singular. Here will be seen a single worker Bee pulling one of these gigantic Drones (which it has already disabled with its sting) with all its might to the edge of the hive board, there several will be engaged in the same manner, endeavouring to fly off with their burden, whilst the ground in front of the hive is strewed with the already dead and dying Drones.

Other species of social Hymenoptera now interest us by their proceedings. The great body of the working Wasps are produced during this and the beginning of the next month, and their incessant attacks upon our provisions, both vegetable and animal, require attention. The most satisfactory mode of destroying the nests of these troublesome insects, is to thrust a piece of rag dipped in turpentine into the mouth of the cavity in which it is built, at dusk, closing the entrance as tightly as possible with a sod. The workers of the different species of Humble Bees are now developed in the greatest numbers, and as there are many species of these insects forming a separate genus (*Bombus*), it will be well to collect a number of specimens for examination. Thistles, in bloom, are their especial place of resort, and here they seem to revel until they sometimes become quite intoxicated, and almost unable to fly, when their motions, on being disturbed, are the oddest imaginable.

Several species of Dipterous insects which might, at first sight, be mistaken for Bees, now infest our horses and cattle, especially several species of Tabanus, which are armed with a powerful apparatus of lancets in their mouths, capable of inflicting very severe wounds through the skin of the horse. The Bot Fly (*Gasterophilus Equi*) may also now be seen hovering near or among horses, trying, with exemplary patience, to deposit its eggs, by means of its long retractile ovipositor, in those places which the horse is able to lick with its tongue; thus, not only hatching the egg by its warm moisture, but carrying the young grub, when hatched, into the mouth of the animal, and thence to the stomach, where it feeds. The Œstrus Bovis is still more annoying to horned cattle, seeking to deposit its eggs in their backs, where the larvæ form large tumours beneath the skin. The destruction of the Daddy Long Legs, as advised in our former article, cannot be pursued in gardens with too much assiduity, if the preservation of the next year's plants be an object of care with the gardener.

Another tribe of insects now makes its appearance, attracting our attention by its musical powers; these are the different species of Grasshopper which now abound in hedges and grassy places; some account of these will be given in our September Calendar.

J. O. W.

DELPHINIUM CHEILANTHUM, VAR. HENDERSONI.

Nat. Order, RANUNCULACEÆ.

GENERIC CHARACTER.—Delphinium, *Tournefort*. *Calyx* coloured, of five sepals; sepals imbricated in æstivation, unequal, the outermost produced into a hollow spur at the base, all deciduous. *Corolla* of four hypogynous petals, free or coalescent above into one piece, open at the top; the fifth upper petal wanting; the two inferior produced at the base into an appendix (internal spur) contained in the spur of the calyx. *Stamens* numerous, hypogynous. *Ovaries* mostly three, more rarely one or five, free, one-celled; *ovules* on the ventral suture, numerous, in two rows. *Capsule* follicular, membranous, beaked with the style, dehiscing longitudinally down the ventral suture. *Seeds* angular, with a spongy membranaceous testa.—(*Endlicher, Gen. Plant.* 4796.)

DELPHINIUM CHEILANTHUM, *Fischer*.—Stem erect, branching; leaves five-parted; lobes oblong, acuminated, sub-trifid, subdentate; pedicels longer than the bracts; petals shorter than the calyx, the two inferior with an obliquely-inflexed, ovate, entire limb; capsules with a coloured reticulation, pubescent.

Var. Hendersoni, Henderson's Bee-Larkspur.—Flowers azure blue, veined, the discs of the lower petals with a yellow beard; capsules glabrous.

DESCRIPTION.—A hardy herbaceous perennial, with large, showy, rather distant flowers. Leaves five-parted, the lobes oblong and acuminated, trifid or obscurely bi-trifid, four inches in diameter, on long petioles; floral leaves three-parted, with the lobes broadly linear, acuminated, simple. Racemes axillary and terminal, lax; the pedicels longer than the bracts. Flowers large and showy, ultramarine blue, with veins a little deeper; two lower petals with a roundish ovate limb, obliquely inflexed and whitish in the middle, bearing a yellow beard, slightly irregular on the margins, with a few ciliary hairs at the apex. Ovaries three, glabrous, green, veined with blackish lines.—A. H.

HISTORY, &c.—We learn from Mr. E. G. Henderson, of St. John's Wood, in whose Nursery the plant from which our drawing was made, has been bloomed, that the variety is one raised by M. Chauvier, of Paris, of whom the seedling plant was purchased by Mr. Henderson. It proves to be a free grower, and in the size of its flowers, and the brightness of its colour, surpasses every other Bee-Larkspur we have seen. Our drawing was made from the blooming plant early in July of the present year.

CULTURE.—For the flower-border, or for large beds, this hardy perennial herb will be quite an acquisition. All the Delphiniums grow freely in a rich, open, loamy soil, and prefer a situation where the subsoil is cool, and the subjacent earth not very liable to parch during the growth of the plant. In fat, rather damp, peaty soil, they grow also with great vigour, and generally assume a deeper green colour in the foliage, if not a richer hue in the flowers, under such circumstances. They are propagated readily by dividing the plants just after they start into growth, and also by seeds; the latter mode, however, is hardly to be depended on for the perpetuation of the kinds, as there is a tendency to variation in the progeny.—M.

THE CIRCULATION OF "SAP" IN VEGETABLE TISSUES.

BY J. TOWERS, ESQ., C.M.H.S.

THE movements of the sap in trees and shrubs are subjects of inquiry and deep interest with the vegetable physiologist. Several articles have appeared during the present year, in one or more of the horticultural periodicals—none of which, after attentive perusal, have led to any satisfactory conclusion. To one of them, indeed, from the pen of, I believe, an eminent practical gardener, I devoted particular attention, as it gave the details of a protracted experiment, which appeared at first rather startling. The original article is lost, or so mislaid, that I cannot cite any extract from it now; but the leading fact announced made it appear that a long and vigorous shoot near the lowest part of a vine under glass (not fruitful, but developed in 1849), was selected for experiment, and divested in the early part of this year of all its buds save three or four at the upmost extremity. These were the sole remaining channels of the sap, and when the ascent became manifest by their enlargement, the branch (fifteen feet or more long) full of juice, was severed from the tree at its origin from the trunk.

After a time, and at certain periods of the day, but not continuously, a quantity of sap fell in drops from the lower extremity, thus proving, as it was argued, the descent of the sap through a great extent of wood, which had for weeks been deprived of buds throughout perhaps nine-tenths of its length.

The descent of the sap can only be proved by a series of correct experiments upon trees actually growing in soil, undisturbed by artificial processes; and who could by any appliances perform or carry through such a series? Mr. Knight, of Downton, endeavoured to determine the channels through which the sap ascends, by means of cuttings plunged and kept for a time in purple-coloured infusions. During the correspondence with that great man, from the summer of 1830 to within a year of his decease, an opportunity occurred to allude to the errors which must inevitably arise from any experiments with mutilated members of vegetables; and, with that frankness which was peculiarly his own, he at once admitted that in any case where a plant, or portion of a plant, was so disturbed by eradication or mutilation as to interrupt the harmony of vital action that exists between the atmosphere, the plant, its roots, and the earth, by which these are supported, no just or philosophical conclusion could be arrived at from experiments under such conditions. The amputation of the branch of the Vine that had been disbudded could not therefore furnish any proof of the descent of the sap from the apex of a plant to its roots, while growing and in full possession of its vitality.

"Circulation of the sap" was the term by which our forefathers attempted to express a series of movements that they could not comprehend. Circulation proper, implies a motion corresponding in its principle with that of the blood in man and animals, or one which may be represented by the flow and return of water through the pipes of a hot-water apparatus. But we ask, can any one of us, who has carefully observed the phenomena of vegetable growth, suppose that they afford evidence of a regular upward and downward flow of the vegetable fluids. We may never be permitted to discover the precise course, nor the exact vessels and cells through which they pass and are elaborated; but perhaps we may not be far from the truth if we admit, to a very great extent, the theory of the late Thomas Andrew Knight, so far at least as it applies to the channels and course of the vital fluids.

The raw sap absorbed by the roots ascends through cells of the sap-wood (alburnum) in trees, or through cellular tissue in vegetables; it enters the leaves, partially exudes as water through the transpiratory pores, undergoes due laboration and change in appropriate cellular tissue, and then in the state of *cambium*, or proper juice, passes downward and through the *liber* or new bark; and thence is conveyed laterally through the medullary processes, termed by Mr. Knight, "convergent rays or layers," till it reaches the central medullary sheath. In its course all the specific aromatic, gummy, resinous, or saccharine principles are developed, and duly deposited; and thus the sap from the roots performs all its natural offices, being entirely conveyed and applied to all parts of a plant, depositing the several products of elaboration, but not in any degree returning back into the roots as sap, otherwise than as a nutrimental matter suited to the requirements of the radical tissues.

Such I believe to be the substance of Mr. Knight's theory, to which modern discoveries may have added some facts connected with the absorption of carbonic acid and solutions of silica, potassa, and other inorganic bodies laborated in the soil.* Much remains to be adduced concerning the processes of vegetable chemistry, but on the subject of the sap's course I think that the view embraced by Mr. Knight is in every way luminous and comprehensive.

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ON CLIMATE.

By E. J. LOWE, Esq., F.R.A.S.

We shall now bring under notice those local circumstances which influence the climate of a locality. Towns raise the temperature of the immediate neighbourhood, because the walls of the houses absorb a large quantity of caloric during the day, which they give out again at night. In consequence of towns being warmer than the surrounding country, no dependence can be placed upon the observed direction of the wind near them; for if on the west side we find a north wind, it is not uncommon to observe one on the east side coming from the south; and indeed it frequently happens that in different parts of a town the wind is blowing from almost every point of the compass, for the temperature being warmer in the interior, and consequently its specific gravity lighter, cold heavier air will rush from the surrounding country into the town. Therefore, with our increase in buildings, we make the climate milder, and also change the direction of the currents of the air. The next great alteration in temperature is produced by draining swamps, fens, and morasses; and the third by the felling of large woods, such as those in North America, all which are accomplished by the labour of man, and each tends to temper the climate, for changes produced either by the draining of swamps, or the clearing of large forests of trees, even at very great distances from us are felt in a greater or less degree, and the effect around those places near where they take place is very sensibly perceived, as in Canada, where the climate is rendered much milder.

Mountains have great influence over winds, and it is natural that they should when we consider that the great bulk of the air is near the earth's surface; therefore they must act as impediments.

The daily average rate of the wind at Greenwich, between October 1849 and March 1850, varied from 70 to 155 miles. It will thus be seen that the rate of movement of the wind varies very considerably. It is by the power of the winds that obnoxious gases, &c., which, if they remained, would be the death of plants, are borne away at a rapid rate.

Guy Lussac, to whom we are indebted for many very valuable observations on the atmosphere, especially by the means of balloons, made some very important experiments with respect to our atmosphere, by collecting flasks of air at various heights above the earth's surface, and afterwards analyzing them, from which it was found that the proportion of the constituents of the air is precisely the same at the elevation of four and a quarter miles as it is at the sea level.

ON THE EFFECT OF CLIPPED TREES IN DECORATIVE GARDENING, AND HOW FAR THEY ARE ADMISSIBLE.

By H. NOEL HUMPHREYS, Esq.

THE first attempts at decoration, in many branches of art, consist in simply subduing the irregularity of natural forms to geometric shapes, in the regularity and repetition of which the eye of the most untutored recognises at once the existence of certain laws of order, which are necessarily the earliest steps of every advance in civilization, whether social, political, or artistic. Thus, the Indian savage pares away the rugged bark of his club, and in its place carves with laborious care a series of zig-zag, or serpentine lines, the evenness and regularity of which constitute, in his estimation, their greatest merit. But there arises, sooner or later, an epoch in the advance of art when formality in its turn gives way, and a return to natural outline takes place. It is then that we find another race of artists disdaining the regular patterns of the half savage, and positively imitating, by laborious and painstaking manipulation, the rugged bark and knots which were pared away by the earlier carver to make way for his symmetrical notching. So, in gardening, the first steps in the direction of ornament have always been clipping and cropping; first, merely to obtain regularity of line, squaring and levelling being the highest aim of the earliest practitioners in the art. These simple ends are soon accomplished, and more ambitious views succeed, when temples and amphitheatres, colonnades and porticoes of verdure become the great objects of a race of architects in foliage. In Italy the art rarely passed these bounds; but in the north, especially in Holland, Belgium, and England, trees were clipped into human figures, and these leafy monsters became a positive rage: the Yew, the Box, and other trees whose close growing foliage rendered them most suitable for torturing into these unnatural shapes, being cropped and sheared till it was supposed they resembled shepherds and shepherdesses, dogs, peacocks, and other forms; to add to the reality of which, painted faces and hands, &c., &c., were added,—such additions rather increasing the absurdity, than aiding the wretched imposture. The return to nature (as in the case of the carver of the club, and his successor of a later period) was as violent as its departure; and a race of "landscape gardeners" arose, who swept away with relentless hand the avenues, the bowers, and the quaint figures which the foliage of the slow growing Yew had, with the most careful clipping and tending been a century in producing. We have in England but few old gardens remaining which can show remnants of this exploded taste; but in Holland many may yet be found revelling in all their pristine formality and stiffness; and in Hanover the curious gardens created by George the Second for his too famous mistress,—mentioned in the entertaining memoirs of Lord Hervey,—are still in their original state, a kind of German Trianon, in which all kinds of cropt absurdities are still carefully maintained and trimmed.

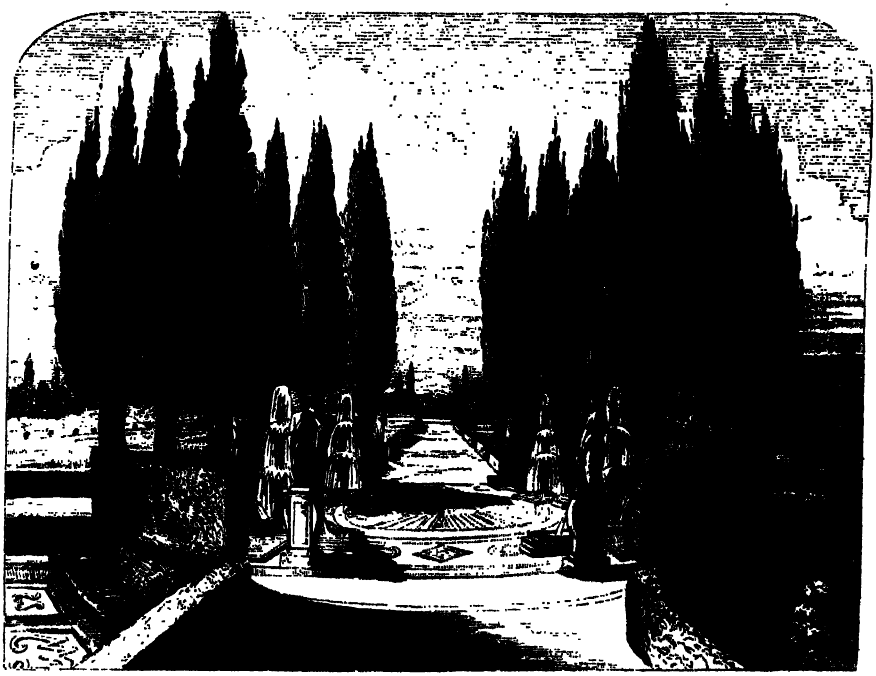
But the object of the present article is to suggest the partial revival of the best features of this taste, in proper situations and under suitable circumstances, and it is from some of the best Italian gardens that we shall be furnished with the best hints for the partial readoption of architectural and other simple and severe forms in foliage. The garden seat, from the villa Strada near Rome, backed by a screen of carefully cropped Limes, the outline of which harmonizes with that of the seat itself, is a good example of a style, and an extent, to which symmetrical cropping may be safely resumed with good effect. Let us imagine a tolerable extent of shrubbery formed of well-grown timber trees, with an undergrowth of Laurels and other evergreens, intersected in various directions by means of winding walks. In the midst of this shrubbery, let us suppose an open space of quadrilateral form, each side occupied by a seat and cropped screen of foliage similar to the annexed engraving—a square plot of grass, with a fountain, a sun-dial, or merely a large vase filled with flowering plants in the centre, surrounded by a broad trimly-kept gravel walk, and it will be easy to conceive that such a combination of regular forms occurring in the midst of a shrubbery similar to the one described, would create a most pleasing contrast, and be a spot often sought during the summer months for quiet meditation; as there would always be one shady side, and the surrounding trees would diffuse a pleasing general coolness.

The engraving (p. 61), also from a celebrated Italian villa, is termed the Theatre of Cypresses. With

GARDEN SEAT OF THE VILLA STRADA, NEAR ROME.

or without its dressings, in the form of fountains, statues, &c., &c., such a disposition of forms might be made successfully available in an English garden in many ways; but there is one which I more especially wish to suggest. Our modern geometric flower-gardens, when of considerable extent, generally produce a samely and unsatisfactory effect, from their uniform flatness of surface, few of the plants cultivated for the purpose of producing masses of colour growing to any considerable height. I recollect noticing particularly how conspicuous this defect of flatness appeared to me in the otherwise fine flower-garden at Trentham. In addition to the defect of flatness—that of seeing over all the surface at one glance, destroys to a great extent the eagerness and curiosity to examine the more distant parts—which should always be considered a fatal defect in gardenesque compositions. To remedy this, I propose introducing, in a geometrical flower-garden, either one, four, or more examples, according to space, of such a composition as the annexed "Theatre of Cypresses." I will imagine the space only suitable to one group, which, in that case, would of course be central. The hedges might be formed of Privet, or some other quick-growing evergreen—some of the new Berberries for instance; instead of the Cypresses, in our climate, some hardy tree of spiral growth, but considerable size, might be selected, as great height is necessary to the effect I wish to produce. In Italy, the "sky-cleaving Cypress," as Shelley has so picturesquely termed it, attains to the size of the Poplars of the north, and forms a most character-

AMPHITHEATRE OF VERDURE.



THEATRE OF CYPRESSES.

istic feature in Italian scenery; indeed, an Italian landscape without Cypresses, or an English one entirely without Poplars, might be compared to the view of a city without steeples, the monotony of which would be insupportable to an eye seeking artistically for agreeable and striking combinations of form.

From this it will be understood that the writer would prefer a geometrical flower-garden, the monotony of which was broken up and varied by a few lofty and finely-grouped objects, to one of uninterrupted flatness, varied only by patches of colour. Other advantages would also be obtained; for instance, within the newly enclosed circuit of the group of tall trees, there would be a space where certain plants, which suffer from too much sun might be more successfully cultivated than elsewhere, and even on the north side of these trees certain shade-loving flowers would find an appropriate situation. In addition to these advantages, and the improvement to the first general view, a certain legitimate degree of intricacy would be attained, which is always agreeable. All could not be seen at one superficial glance—something choice would be imagined within the well-hedged circle; and beyond it, and on either side, would be certain partially concealed portions of garden, which one would be thus tempted to explore. In the midst of an irregularly-planned flower-garden, I would scarcely recommend such an object as the "Theatre of Cypresses," but as a good centre to a geometric plan, I think it could not be otherwise than effective and agreeable, and at this time, when all effects to be produced by cropping have been so completely abandoned, it would be a positive novelty.

The example (p. 60) is also from an Italian garden and is styled an "amphitheatre of verdure" "*amphiteatro di verdura.*" The introduction of a somewhat similar feature in an English garden might in some instances be very successful, but more especially, as in the former case, in a geometric one. Let us suppose a secluded flower-garden terminated on one side, perhaps, by a terrace near the house, and on the three others by shrubberies. From either side of the terrace, an arcade of cropped Limes might separate the trim flower-garden from the free growing, shrubbery, and at the end, opposite the terrace, the garden might with good effect terminate with the *amphiteatro di verdura.* Trimness of form thus exhibiting itself, not only on the ground, in the turf, and the form of the beds, &c., but also above the eye, in the outline of these *sculptured* Limes, thus giving greater completeness to the geometric character of the general composition. The trunks of the Limes might either be covered with hardy climbing Roses, or by a little careful management clothed with their own foliage as in the Italian amphitheatre, above which, as in the garden before described, the trees of the surrounding shrubberies, appear softening the rigid outline of the cropped trees, and forming a soft and irregular "sky-line," which would gracefully complete the composition. It will be seen by the above remarks that, in resorting to the abandoned custom of reducing foliage to arbitrary forms, only the most severe and simple are advocated, and even then only in well considered situations, where the contrast, or the harmony of forms, would be artistically aided by such means.

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THE CULTIVATION OF MOSSES.

By Mr. G. LAWSON, F.B.S., Assistant Curator to the Botanical Society of Edinburgh.

RECENTLY (see vol. i., p. 210) we directed the attention of horticulturists to the interesting and numerous tribe of *Mosses*, which, although long admired for their beauty in their native homes, have only recently been introduced to garden culture. With the view of aiding those desirous of cultivating these tiny plants, we gave such general hints as occurred to us regarding their habits, and the modes of treatment likely to prove most successful; and, on the present occasion, we proceed to redeem our promise to enter more minutely into the history of the various species adapted for cultivation, as well as to consider the particular conditions of soil, exposure, &c., requisite for their successful development.

And, first, of the genus POLYTRICHUM. *P. undulatum*, which occurs in considerable abundance in the woods, and indeed in all moist shady situations, is a species well fitted for the Moss-garden, provided it can always be kept in an atmosphere loaded with moisture. Its large lanceolate undulated leaves are peculiarly susceptible to atmospheric influences; in moist weather they are spread out, and give the plant a beautiful appearance; but immediately that a drying wind meets them in its way, they are curled up, and have lost all their beauty. The large cylindrical curved capsules are produced abundantly throughout the winter and early spring. The plants should be removed in tufts from their woodland home in the autumn, preserving a good ball of earth around each tuft. The soil used in potting should be of a retentive character, little or no drainage being given, and plenty of water afforded at all times excepting in the summer season, when the plants will be in a more dormant condition. Drying winds should be carefully guarded against. *P. urnigerum* is also a neat plant for pot culture, and, although it does not require so moist an atmosphere as the preceeding, it should be well supplied with moisture at the roots. Peat may be freely used in potting this species. *P. alpinum* may receive similar treatment. *P. commune* is a very common Moss, especially in the north, growing abundantly on heaths, and in the woods; but from the circumstance of its growing in broad patches of considerable extent, it is a difficult matter to get a convenient portion separated from the mass in a state fit for growing: *we* never could manage it.*

The Extinguisher Mosses (ENCALYPTA) are such beautiful little things that they tempt us to bestow upon them a little more trouble than usual, although they are by no means especially recommendable to the gardener's attention. The common species (*E. vulgaris*) being annual, must be sought for yearly during the winter season on some neighbouring wall or bare earthy bank, and potted in any sort of soil, the plants being removed with a lump of the earth on which they grow. They will produce their capsules, each covered with its curious extinguisher-like calyptra, early in the spring; and although the plant altogether is exceedingly small (in stature scarcely an inch), it has notwithstanding, so curious and attractive an appearance, as at once to arrest the eye of the passer by, whether he be muscologist or not. *E. ciliata* is even more beautiful, and being perennial is more convenient in the cultivator's hands. It is, however, more rare, being chiefly confined to the lofty mountains, and thus it is beyond the reach of many. It may readily be distinguished from *E. vulgaris* by the delicate calyptra being beautifully fringed or toothed at the base, that of the common species being quite entire. The rare *E. streptocarpa*, having also a toothed calyptra, is distinguishable by its much larger size, blunt leaves without any prolongation of the midrib (as in the other kinds), as well as by the spirally streaked capsules.

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* Speaking of the *Polytrichum commune*, old Lightfoot says:—"Of the female sort the Laplanders, when obliged to sleep in desert places, frequently make a speedy and convenient bed. Their manner of doing it is curious: Where this Moss grows thick together, they mark out, with their knife, a piece of ground, about two yards square, or of the size of a common blanket; then, beginning at one corner, they gently sever the turf from the ground, and, as the roots of the moss are closely interwoven and matted together, they, by degrees, strip off the whole circumscribed turf in one entire piece; afterwards, they mark and draw up another piece, exactly corresponding with the first, then, shaking them both with their hands, they lay one upon the ground, with the moss uppermost, instead of a mattress, and the other over it, with the moss downwards, instead of a rug; and between them both take a comfortable nap, free from fleas and bugs, and without fear of contagious distempers. It is probable they might take the hint of making such a bed from the bear, a cohabitant of their country, which prepares his winter quarters with a large collection of this same moss." Might not the wandering botanist frequently enjoy a slumber between two cushions of Polytrichum, instead of wandering many a weary mile for the airy shelter of a miserable *shieling*, or stretching himself beneath the less comfortable protection of a Birch or trembling Poplar?

The genus WEISSIA does not offer many promising subjects for cultivation; but *W. nigrita* is well worthy of a trial. It is one of the few species that seem peculiarly suited for growing in sandy soil, but it must be kept pretty moist. It frequents moist banks among the highland mountains, and is seldom found at a very low elevation; but on the well known sands of Barry (of botanical celebrity), we have picked it within a few feet of the sea level.

BRYUM is richer in cultivable beauties; and, indeed, almost all of the species are worth growing, being of easy culture. Among the more beautiful, are *B. ligulatum*, *B. roseum* (*very* rarely found in a state of fructification), *B. punctatum*, *B. marginatum*, *B. rostratum*, *B. hornum*, *B. ventricosum*, &c. *B. argenteum* and *B. cæspititium* frequently occur on the roofs of houses, and on old walls, banks, &c., and thus should be kept pretty dry in cultivation; but, by far the greater number grow only in moist shaded situations, and should receive corresponding treatment when grown in artificial circumstances. This should be more particularly observed in the case of the large leaved species, which can only be maintained in their native beauty by being continually surrounded with a moist and cool atmosphere.

HYPNUM is decidedly the most extensive genus of Mosses, embracing as it does, about one hundred species and varieties. There is a strong general resemblance among all the family, by which they may be readily recognised; but in many cases they run so closely into one another, and are separated by so minute differences that it requires a long and patient study of the various species under all modifications of circumstances, to give one anything like a complete knowledge of this critical genus. We could not ask any horticulturist, who has closely to follow the rapid progress of phanerogamic botany in the present day, to encounter the arduous task of acquiring an intimate acquaintance with native Hypna; but luckily there are many of our most showy species so perfectly distinct, that once seen correctly named they cannot readily be forgotten,—and to a few of these we think we may safely recommend the cultivator's attention. In the first place then, *H. crista-castrensis* may be noticed, as, in our opinion, the most elegant of British Hypna, if not of British Mosses. It is by no means a common species, being chiefly confined to alpine districts; but it is not so rare that it may not readily be procured for cultivation: we have gathered it in various places in the low grounds of Forfarshire. It generally occurs in woods in large spreading patches, and in removing the plant it will be advisable to lift it with a piece of the turf. This moss should be kept cool, and in the shade; but it does not require much moisture. *H. splendens*, as its name would indicate, is also a *splendid* moss, and is much more common, occurring frequently on hills and heaths, and on the old walls and tree-roots of dry woods. Its capsules are by no means rare. The treatment recommended for the preceding species, may, with equal propriety, apply to the present; and in the same category we may rank, *H. purum*, *H. undulatum*, *H. triquetrum*, *H. loreum*, and *H. proliferum*, all of which are well worthy of a little care and attention, and may be readily found in some adjoining woodland. The curious *H. scorpioides*, with *H. dendroides*, and *H. aduncum*, may be found in bogs, and such moist situations, and in cultivation, of course, require an abundance of moisture. *H. alopecurum* and *H. ruscifolium*, most frequently attach themselves to wet dripping rocks, the latter often immersed altogether in the waters of a running stream, or the crystal column of a waterfall. Both of these should be kept continually *wet*, and out of the reach of sunbeam or summer breeze. *H. ruscifolium* may be advantageously introduced for the adornment of artificial waterfalls, or running streams in a garden. But it should be kept in view that nothing makes a better harbour than it, for hordes of aquatic insects.

Whoever has a feeling of esteem for the Director of the Royal Botanic Garden at Kew, will endeavour to obtain a bit of *Hookeria lucens*, from some shady bank, and cultivate it, as at once one of the loveliest and most interesting of the muscological objects under his care. The Hookeria requires a good deal of moisture, and may never see a ray of sun from the 1st of January to the 31st of December.

The genus FISSIDENS is one of peculiar interest and beauty, and *F. bryoides* will long be associated with the never-to-be-forgotten name of the African traveller. *F. bryoides* and *F. taxifolius*, are of frequent occurrence on moist banks and in shady woods, and as they generally grow in extensive patches, a few dozen of these tiny plants may be taken up upon a piece of the earthy turf, and transferred to the flower-pot without marring their delicate beauty. They require to be kept well shaded and moist, to preserve the beauty of their delicate leaves; but *F. adiantoides*, a much larger growing species, requires even more moisture, its native habitats being in bogs, and other wet marshy places. There is one species of Fissidens, which, although not belonging to our native flora, we are tempted to enumerate here, as greatly worthy of the Moss-grower's attention; this is the *F. grandifrons*, observed by Spruce to be the characteristic Moss of the Pyrenees, and which is truly magnificent if that term is at all applicable to any member of this lowly tribe of plants.*

In the genus DICRANUM, we can only with safety recommend *D. heteromallum* and *D. scoparium*. The former is by no means unfrequent on moist shady banks, clothing them with its bright green verdure, and pretty little capsules; and the latter may be found in great profusion on many of the hills and mountains, preferring rather dry, though cool situations. The different conditions under which these two species are found should regulate their garden treatment.

Trichostomum lanuginosum and *canescens* occur plentifully on heaths, and stony mountainous situations, and may be readily grown in peaty soil, being kept cool and not too moist. *Tr. heterostichum*, *fasciculare*, &c., should be removed attached to the stones or fragments of rock on which they grow, the same being firmly potted in a light peaty soil, and kept rather dry. *Tr. lanuginosum* is a strong growing plant, and requires plenty of pot room.

Didymodon capillaceum, although sometimes found at a low altitude, must be considered as truly a mountain species. It should be removed along with a portion of the firm peaty turf on which it is generally found, and kept very cool with a good deal of moisture at all seasons. *D. purpureum* will be much easier cultivated, as it is often found naturally in cultivated pasture fields, and seems to love bare earthy places where the ground has been stirred by human operations. The rare *D. inclinatum* will succeed well in light sandy soil, kept rather moist.

Funaria hygrometrica is a curious plant that grows almost everywhere, and is especially recommendable to the tyro in Moss-culture, as it will be impossible to fail with it. The beautiful *Neckera crispa* may not be so easily cultivated; but it well deserves care and attention, and with plenty of moisture and shade, and what is not less essential, a cool atmosphere, we have no doubt but it may be readily succeeded with. Various species of *Bartramia* are likewise very beautiful, and may receive the same treatment.

The species of Mosses we have noticed in the preceding remarks are, with one or two exceptions, those only which should be potted in mould in the manner usually done with the higher tribes of plants. Many there are, however, that require to be grown attached to rocks and stones, and there is likewise a numerous aquatic family that require to be continually immersed in water. In our former paper we gave general instructions regarding the culture of these kinds; and as, with all the species of each of the divisions, the treatment is so very much the same, we would deem it a trespass to dwell farther upon them.

It will be observed that in these papers on the cultivation of Mosses, we have given no instructions for the erection of *structures* purposely adapted for their cultivation. We have refrained from doing so under the impression that few horticulturists, if any, will consider those plants worthy of a separate structure for their growth. The time *may* come when patriotic gardeners will admire our native Mosses more than the Heaths and Orchids of foreign lands, and treat them with corresponding care. But, alas! the idea is Utopian! we may as well think of growing toad-stool forests for timber!! The most convenient mode of keeping Mosses is to have them in a frame with a northern exposure, and completely shaded, or if that cannot be had, they may be placed behind a wall, the position of which secures these conditions, without exposing the plants to drying or frosty winds, which prove highly detrimental to them. The most successful mode of keeping them continually moist (and moisture is essential to the success of the great majority), is to plunge the pots to the rim in Hypnum Moss, which retains the moisture well: Sphagnum will also do, but will retain too much moisture for some of the species; and when it once gets dry is difficult to get thoroughly moistened again. The plants may be removed to the back stage of a cool greenhouse at the beginning of winter, as they will thus afford their beauty to the admiring eye, at a time when there is little else to attract attention, although the very season when they are in their gayest dress. This protection is not, however, essential to their successful cultivation, and they will push up their lovely capsules with equal force through the wreath of snow. Many of the Mosses are well suited for adorning rock-work, and imitations of natural scenery; and we hope yet to see them used extensively in this way.

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* In the *Transactions of the Botanical Society*, iii., 117, Mr. Spruce in speaking of the Fissidens grandifrons remarks:—"It will not be out of place to mention here a curious circumstance relating to this Moss. Its *fruit* has never yet been found, and even its *flowers* were unknown when it was figured in the *Bryologia Europæa*. A few years ago Mr. Sullivant discovered female plants at the falls at Niagara, and in 1846 he published the specimens in his beautiful "*Musci Alleghanienses*" (No. 186). In January, 1846, a single tuft of male plants was found by myself and M. Phillippe, on a dripping limestone rock, near Bagnères, and the inflorescence will be described in the proper place. These are all the flowers that have ever been found, and it will be a remarkable circumstance if it be ascertained (as this would seem to show) that *only the male plant exists in Europe, and only the female in America!* The obvious conclusion would be that the plant never had fruited, and without artificial aid never would fruit. It has, however, ample means of maintaining and spreading itself without the aid of seeds."

WILMOT'S PRINCE ARTHUR STRAWBERRY.

DESCRIPTION.—The distinguishing characteristics of this fine Strawberry are a dwarf and compact habit of growth—the foliage upon the strongest plant rarely exceeding six inches in height; and a disposition in the plant to expend its energies in the production of flowers and fruit, rather than in a profuse development of runners and young plants. The fruit, which is produced upon short foot-stalks, is conical and obtusely angular in form, and is from one inch to one and a half inch in diameter, and about the same in length; it is of a bright pale crimson colour, fleshy, and thickly set with rather large seeds. The flavour is good and rather acid, and though inferior to some of the early kinds, as the British Queen, is very superior to the very best of the late varieties; and, when thoroughly matured by full exposure to the sun, is somewhat like that of the Hautbois. It is a very late kind, not coming into bearing until the British Queen is quite over, and in a shady and cool situation will continue to produce good fruit until the middle of August; it colours perfectly to the point, and is so firm in in texture, as to bear rough handling when quite ripe, without injury, and will remain fresh and good for three or four days after it is gathered.

WILMOT'S PRINCE ARTHUR STRAWBERRY.

HISTORY.—A seedling raised some four years back by Mr. Wilmot, the eminent horticulturist of Isleworth, Middlesex. It is evidently a cross between the Elton and the British Queen —the plants partaking of the character of the former, and the fruit of the British Queen, with the strongly marked external appearance (more especially as regards the seeds) of the Elton. It is a very hardy, but delicate, grower; bearing enormously, and finishing the late fruit completely. We saw several *acres* of it lately at Mr. Wilmot's; and, though a vast quantity had been gathered, the ground around the plants was literally *paved* with Strawberries, none remarkably large, but all of a good useful size. As a late Strawberry, more especially for market purposes, it is calculated to displace the Elton and Turner's Pine, as dessert fruit; and, though inferior in colour to the Elton, will doubtless be found, from the fleshy character of the fruit, an excellent preserving kind.

CULTURE.—To offer any remarks upon the culture of the Strawberry almost appears an act of supererogation at the present time, but as there are thousands in the country who have no conception of the treatment pursued by those horticulturists who supply the London markets, a few remarks upon the subject may not be out of place. Some statistical facts, as connected with the cultivation of the Strawberry, might here be introduced, but as they will come more appropriately in another place, (the Statistics of London Market Gardening) we may reserve them for the present, merely remarking that *one* market gardener (from Enfield) has been known to produce of *one* kind, (the Elton Pine) twelve hundred quarter seives, equal to twelve hundred gallons, every morning for the season, of that kind; and, when we consider that hundreds go to market with smaller quantities, some idea may be formed of the quantity consumed, and the extent of ground necessary for the supply of the metropolis.

Judging from nature, and the wild habitat of the native Strawberry, the dry sand-banks and hedge-rows of our wild "Strawberry of the Woods," one would naturally suppose that they did not require rich ground; that any soil of average quality would grow them; and that deep trenching, heavy manuring, and frequent surface stirring were unnecessary operations, a waste of time, and sinking of capital, quite unnecessary in the management of this admirable fruit. Thus how futile it is to argue that the natural position of a plant is indicative of the most suitable soil; since it is quite evident that our Strawberries would starve upon their natural soil, and would become completely barren.

It is, however, in the vegetable as in the animal kingdom, the higher a plant is bred the more delicate it becomes; and thus, while the Alpine Strawberry, and Welch or Scotch cattle, will live and flourish upon the comparatively barren and Alpine rock, the improved and more refined breeds require the rich valleys of the Lothians, of Ayrshire, of Yorkshire, and Devonshire, just the same as the high bred plants of the Strawberry, the Cabbage, and all our culinary vegetables, require the rich vale of the Thames, or the highly manured and deep-soiled gardens of the country to bring them to perfection. Thus it is possible to change the nature of native plants, and the higher they are bred, and the more refined they become, the more necessary is it to tend them with a parent's care. Having stated this much for the nature of plants, we will proceed to consider what are the most favourable situations for their artificial management.

Now it cannot be denied that our present refined class of Strawberries, to grow them to perfection, requires a deep, highly enriched, porous, and well drained soil; and, where these necessaries of success do not present themselves naturally, means must be taken to provide them for the plants, or the penalty of not providing suitable soils must be paid by the cultivator. Perhaps the best kind of soil that could possibly be selected is a hazel loam, of a retentive, though not too adhesive character. This should be trenched deeply, at the least, three feet, and each layer of soil should be enriched three or four inches thick with manure. If the ground is light or sandy, cow-dung is the best; if loamy, decayed stable-dung; and, if very heavy or adhesive, stable-dung, in a strawy, or half decomposed state. This being trenched in, which it ought to be in the winter or spring, keep it moved and stirred about as much as possible until the plants are ready to plant, which will depend upon the manner in which they have been prepared for planting.

The market gardeners of Deptford prefer planting as early as possible in June, making choice of that ground which has been occupied by Cauliflowers, trenching it deeply, planting immediately, and watering copiously until (and, if necessary, after) the plants are established. For this purpose they take advantage of the first runners, and layer them so as to get them thoroughly well rooted, and being well attended to after planting, they invariably produce a full crop of fruit in the following season. Where the ground is poor or wet, or not considered sufficiently deep, it is thrown into beds four or six feet wide, with paths eighteen inches wide, the soil to the depth of twelve or fifteen inches being thrown upon the beds, and upon these beds two or three rows of plants are planted. After the crop of fruit is gathered, the plants are digged in, and thus Strawberries form one change in the rotation of crops. Those who practice this method of management, assert that the finest and most abundant crops are thus obtained, but it is only upon suitable soils, where proper attention can be paid to them, that such a mode of cultivation could be properly carried out. Upon poor soils it would be almost impossible to get runners sufficiently early to plant out in June, and hence, perhaps, the plan followed by some gardeners, of preserving plants in pots through the winter, and planting them out in the spring would be preferable. This system of cultivation is as follows:—

A quantity of plants are potted in October, and are preserved in a sheltered situation through the winter. In the spring a piece of ground is prepared in the usual manner, and in

March the plants are planted out. Through the first season they are not allowed to bloom but all the flowers are removed while in a young state, and hence the plants become unusually strong, and in the second year produce a most abundant crop. Between the rows, Onions, Lettuce, or any other light-foliaged crop, is grown; which acting as a partial shading to the Strawberries, they are much benefited thereby. Plants thus treated generally produce two enormous crops, and are then destroyed.

Another plan of growing Strawberries, and by which Messrs. Myatt and Son, the well-known growers of Manor Farm, Deptford, have produced their finest fruit, is the following:—A piece of ground having been prepared by manuring and deep trenching; it is marked out into four-feet beds, with fifteen-inch alleys between. In these alleys, either in the autumn or early in the spring, a row of strong plants is planted, and the beds are cropped with summer Lettuce. As the Strawberry plants progress in growth, the young plants from the runners are carefully layered among the Lettuce, taking care to get them established as early in the season as possible; thus the plants become unusually strong, and, under proper management, produce crops of very large fruit.

A fourth plan, and a very excellent one too, upon unfavourable soils, is, after manuring and trenching the ground, to take out trenches the same as for Celery, and, after filling them with proper compost, to plant them with suitable plants. This, where the soil is unusually heavy or very light, gives the plants a fair start, and upon unsuitable soils is one of the best plans that can be pursued.

Strawberry banks, or terraces, as they are sometimes called, are excellent, and more especially in small gardens; as, if the soil to raise the beds can be procured, a very considerable increase of space is gained by the raised banks. The terraces are formed in the following manner:—A space of ground, of any given length, and six feet wide, being marked out, a wall nine inches high, of stones, flints, vitrified bricks, old roots, or wood, is formed, and the space between the walls is filled with suitable compost; upon this compost, and nine inches within the walls, two more walls are built of the same material, and are filled in in the same way, and thus the work proceeds, until the space comes to a single row of plants at the top. A bank of this kind may be planted at any time, taking care, at the time of putting the plants in, to make the surface of the ground to slope inwards, so as to insure a full supply of moisture at the roots. Banks so arranged will generally produce for several years, and with the prepared compost, and the plants being properly exposed to the full influence of the atmosphere, they generally produce very fine fruit. Another advantage of an arrangement of this kind is, that by letting the beds run from east to west, a very early and a very late bed is insured, and thus a supply of fruit may be procured for a longer period than under ordinary management. The front of a Vine border, where the former is, as it always ought to be, above the level of the soil, is an excellent situation for an early bed; and a bed so arranged will always be found superior to such things as "tiles," or any other of the aids so perseveringly recommended for the production of early fruit. Between the plants small stones, slates, tiles, or clinkers from the hothouses may be placed; and thus, by absorbing heat, shading the ground from the direct action of the sun, preventing the evaporation of moisture, and providing a clean surface for the fruit to rest upon, offer advantages which cannot be obtained by any other system of management. As far as our experience goes, the Strawberry tiles do not offer any very superior advantages, and the feet, which raise them above the level of the ground, are certainly no advantage to them, as they prevent the transmission of heat to the soil, they are readily cooled, and facilitate, rather than prevent, the evaporation of moisture. Tiles or slates, resting upon the ground, are very preferable.

So far we have indicated some of the most successful systems of cultivating this admirable fruit, from which we trust the most uninitiated may be enabled to undertake its management. Copious waterings, and with liquid manure, are very necessary, from the time the plants begin to show their blossom until the fruit is ripe; but care must be taken not to over-water them, or the quality of the fruit will be deteriorated.

To write specially of the kind under notice—Wilmot's Prince Arthur, the following is the method of culture we should pursue:—Having procured the plants, we should pot them immediately into four inch pots, in a good rich compost, and place them in a shady situation, under a frame. Through the winter we would protect them; and, about the end of February, introduce them into a forcing house, divesting them of their flowers, if they produced any, but encouraging them to make runners; these we would lay into small pots as they were produced, and thus, by midsummer, we should expect to get several hundred strong established plants, which, under proper management, would form a bed for bearing in the following year, of no mean importance. This is one of the most prolific kinds we have ever met with; and, planted one foot apart, as recommended by Mr. Wilmot, we quite agree that it will produce more fruit than any kind in cultivation. To those who require late Strawberries, and to gardeners in the country who have to send their fruit to London, or a distance, this will be found a very valuable kind; and, when fairly tested, we have no doubt this variety will become a general favourite.—A.

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ON THE USE OF AMMONIA IN HORTICULTURE.*

THE labours of modern chemists have shown us, and it is one of their grandest discoveries, that it is the Azote to which manures owe all their value, and that their fertilizing properties are just in proportion to the quantity of this agent they contain. It is not always in its form of a simple body that this gas is useful; it can only be absorbed by plants in combination with hydrogen, that is to say, in the condition of ammonia. It has also been satisfactorily demonstrated that the atmosphere is the grand source or medium from whence vegetables derive this substance. Hence the great utility of cultivated plants being trenched in the soil, especially if these plants are such as easily give off their azote to mix in the atmosphere rather than in the soil. Leguminous plants, for instance, are very suitable in this respect; and long experience rather than the teachings of science, has taught agriculturists to economize the plants of this family, to enrich the ground which has been exhausted by excessive cropping. Chemistry, properly speaking, has not made this discovery, but it has elucidated and justified a practice long in use.

It may be interesting to investigate the causes which perpetually hold in the atmosphere the quantity of ammonia necessary for the development of vegetables, and which repair without ceasing the losses which they sustain. According to the researches of many chemists, and particularly those of M.M. Boussingault and Leibig, these causes are two in number. The one which is the most direct is the decomposition of organized bodies, which, without exception, contain a greater or less quantity of azote. All vegetables contain it, but it is particularly in the bodies of animals that this agent is condensed. It enters extensively into the composition of their organs, and when, after death, these animals are left to the chemical action of nature, all the elements of which they are constituted separate, and immediately form new, and, for the greater part, gaseous compounds, and among others the ammonia, which returns to the atmosphere, where it soon dissolves in the watery vapour with which the air is always charged.

The second productive cause of atmospheric ammonia has been much less studied, and it is only within a few years that its existence has been suspected. It is known to reside in the electric discharges which succeed one another in the air, at least in certain portions of the globe. It is the opinion of Boussingault as well as of the celebrated Leibig, that the carbonate of ammonia must pre-exist in all organized beings. "The phenomenon of the constancy of thunder-storms," says M. Boussingault in his treatise on Rural Economy, "would seem to justify this opinion. It is said, indeed, that every time a series of electric flashes pass in the humid atmosphere, there is a production and combination of nitric acid and ammonia. The nitrate of ammonia, besides, always accompanies the rain which falls in a thunder-storm; but this acid being fixed in its nature cannot be maintained in a state of vapour. When we consider the reactions which take place between the different compounds in question, it may easily be conceived that the nitrate of ammonia which is drawn to the earth by the rain, and which comes in contact with the rocks or calcareous soil, is afterwards volatilised to the state of carbonate at the next drying of the soil. In such a climate as France, where thunder-storms are rare, we should perhaps scarcely attach so much importance to the electricity of the clouds; but, between the tropics, the electric discharges which take place in the atmosphere are almost incessant, and an observer placed at the equator, if his organ of sound were delicate enough, would hear the peals of thunder continually. There can be no doubt, at the present day, that the carbonate of ammonia is the most active agent of vegetation, and without which all the others would be useless; but this carbonate is gaseous, and, for this reason, cannot be employed directly by the cultivator, who, were he to try to create an atmosphere of the carbonate of ammonia under his ground, would spend a great deal of money without obtaining any benefit whatever, since the slightest movement of the air would instantly produce evaporation of this volatile manure." It is fortunate then that so useful an agent can be insured for the purposes of horticulture wherever a quantity of air can be isolated from the air outside; yet it is somewhat singular that its use, now attracting attention, in the cultivation of plants in the greenhouse, stove, pit, and frame, has not been thought of sooner.

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* From the *Revue Horticole.*

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ON THE CALCEOLARIA AS A CONSERVATORY ORNAMENT.

By Mr. JOHN COX, Gardener to W. Wells Esq., Redleaf.

HOWEVER desirable it may be to erect a standard of excellence for this charming flower, and assert that perfection will only be attained when we have produced a flower as round as a cherry, and alike in colour all round, the probability of such a consummation is yet far distant; and, in the meantime, it is our duty, whilst keeping in mind and practising the means of improvement, not to despise the beauties we already possess; for beautiful they are, and if cultivated in a sufficient number to form a mass in the conservatory or greenhouse, during the flowering season they will fill up many a void, and excite almost universal admiration. The infinite variety and distinctness of their markings, and the many shades of colour, together with their elegant habit when subjected to a careful routine of cultivation, combine to render them objects of great attraction. As we have succeeded tolerably well in cultivating, at Redleaf, such varieties as are out, together with some excellent seedlings, I thought that a concise detail of our practice might not be unacceptable to those who feel desirous of cultivating a selection—first, premising that my remarks apply exclusively to the herbaceous kinds, as the shrubby sorts require a very different treatment. August is the most critical and trying month for herbaceous Calceolarias; and the reason appears to be, that being weakened by the flowering which is just over, and the whole system of the plant stagnated, in consequence of there being no leaves and branches to assimilate food in proportion to the previous excitement, the plant therefore requires rest; and as August is often a very hot month it is difficult to prevent undue excitement, which at this season is often fatal. We therefore select for them a cool shady situation, and take care that they are not over watered. After a little time a new series of roots are emitted around the base of the stem, and when this is perceived it is proper to shake them out of the pots, prune off any of the old dead roots, (but not too close) and repot in sizes smaller and more proportioned to the roots; they are then placed in a cold pit, the bottom of which is well drained and covered with fine coal ashes, each pot is placed on a brick or an inverted flower-pot, so as to bring it near to the glass; they are kept close for a day or two, and shaded, after which abundance of air should be given, and in fine weather the lights frequently taken off. As soon as they have well started into growth, they will require to be cut back so as to reduce them into shape. If the cuttings are not required, this cutting back *may* be done at the time of repotting; but, as it is always best to keep up a young stock, I prefer having them on until the plants have again started into action, at which time the chances are in favour of leaving the old specimens better furnished, and the cuttings are more likely to succeed. We put these cuttings into small pots, and place them in a frame with a gentle bottom heat; they are examined at intervals, and those which are well rooted are removed into a cold pit to harden, previous to giving them more pot room. I have now brought both cuttings and old plants to what I will call the shifting point; and here I must observe that, with reference to the Calceolaria, it is out of place to give any set time for the shifting into larger pots, the state of the roots must be our guide, and consequently both cuttings and old plants must be often gone over, and those only shifted whose roots are in a fit condition. These operations may be carried on in mild weather all through the winter and early spring, for the Calceolaria is, when kept a few degrees above freezing point, in action during all that time; but as that action is slow, the rooting process is necessarily slow also, and therefore the reason why the shiftings cannot be generalised. The Calceolaria does not at any time require a great heat, in fact it would live out of doors if the temperature did not fall below the freezing point, therefore I think it injudicious to prefer keeping the herbaceous sorts in a greenhouse, where fire heat is indispensable, when they may be so much better preserved and grown in a cold pit. I keep them in such a structure up to the time of the bloom expanding, when they are, after being properly secured to neat thin hazel sticks, placed along the front stage of the conservatory, and a shading of thin muslin, a yard wide, fastened *under the glass* the whole length over them; in this situation they expand their flowers in such profusion, size, and beauty of colour, as to excite great admiration—in fact, many persons have made the observation that they had no idea that the Calceolaria was capable of being grown so as to produce such a gorgeous show. Whilst in the cold pits, the plants will require occasional fumigations with tobacco, whether infested or not, as *prevention is better than cure.* They should not be placed too neartogether, and the flower stalks must be secured as they are thrown up. Shading must be resorted to whenever the sun is out strong; at *no time* will the plants bear *intense bright sun:* inattention to this will cause many a blank in plants, and many a crumpled bad flower. With regard to the soil, which also is a point of great importance, I would recommend a rich sandy loam, very fibry and soft, two years from the pasture field; if not sandy enough it must be made so. This will suit them well in the early stages; when the roots are well established and the whole system in full action, an addition of one-third leaf mould and a little very decomposed manure may be made to the loam; at each shifting the drainage must be kept open; and water must be given as required; when in full growth they require plenty.

In the production of seedlings, I impregnate the best sorts, and sow the seed in October. When well up, the plants are pricked into shallow pans, and kept in the cold pit all the winter. In the spring they are planted on a north border (previously prepared with nice fresh loam), nine inches apart, the best are marked during the blooming season, taken up and potted in September, and placed in the cold pit, subject to the foregoing routine.

Miscellaneous Notices.

Horticultural Society, Aug. 6th.—This meeting was very thinly attended, and the productions, with the exception of some Pine Apples and a collection of very beautiful Hollyhocks from Mr. Chater, of Saffron Walden, were not of remarkable interest. Mrs. Lawrence sent nicely bloomed plants of Ixora grandiflora and Rondeletia speciosa, and a neat collection of Orchids, among which, the following were the more remarkable:—Miltonia spectabilis, nicely bloomed; Aërides quinquevulnerum, dwarf and neat; Odontoglossum hastilabium, which proves a very desirable kind, remaining a long time in bloom; with Burlingtonia rigida; Dendrobium formosum; Angræcum caudatum; Anguloa uniflora; and a new plant with dull greenish-yellow flowers of no interest, said to be a species of Eulophia. From the garden of the Society Mr. Gordon produced Aërides quinquevulnerum, in beautiful condition; Oncidium Harrisonii, a dwarf, and scarce, and very pretty species; Oncidium guttatum; Spathoglottis Fortuni, a very free blooming terrestrial orchid with yellow flowers; Ornithogalum conicum; Æchmea fulgens, with several varieties of Achimenes, and some other plants. Of fruit, Mr. Jones, gardener to Sir John Guest, sent five, remarkably handsome, Ripley Queen Pines, of the respective weights of 6lbs. 4oz., 5lbs. 13oz., 5lbs. 12oz., 5lbs. 8oz., and 5lbs. 4oz. More perfect fruit than these it is impossible to conceive. With them was a Providence weighing 11lbs. 11oz., but very much past its prime. Mr. Spencer, gardener to the Marquis of Lansdowne, sent a very handsome Pine, called the Black Prince, weighing 11lbs. 11oz. It is a black kind of the Blood or Sugar Loaf group. Of Grapes, Mr. Judson produced some bunches of the Richmond Villa Black Hamburgh, a seedling raised at Brighton, remarkable for carrying a rich bloom, and said to ripen a fortnight earlier than the common Hamburgh. Some certificates from Grape-growers in the neighbourhood of Brighton were read. We have tasted it, and, in point of flavour, consider it very inferior. There were some bunches of a Grape, said to be Wilmot's Black Hamburgh, sent from the Garden, but they were very different to those generally cultivated as that variety, being much rounder, less fleshy, and superior in flavour—in fact, a superior Grape to Wilmot's Hamburgh. Melons of the Bromham Hall kind were sent from Mr. Brundy, gardener to Lord Dynevor, and from the Society's Garden, the same kind cut; and, though excellent in flavour, it was far too thick-skinned to become a general favourite.

Mr Ferguson produced some fine Nectarines and Peaches; and, from the garden of the Society were two new French Cabbages, and some French Beans, remarkable only for small size, and a pale yellow colour.

Mr. Chaters' Hollyhocks, which were really very splendid kinds, comprised of the following sorts:—Napoleon, red, and buff; Rosea grandiflora, light pink; Delicata, French white; Attraction, veined chocolate, and white, very remarkable; Formosa, claret; Commander-in-Chief, light edged rose; Model of Perfection, fine white, chocolate ground; Walden Gem, bright crimson; Atrosanguinea, rich dark crimson; Magnum Bonum, maroon; Snowball Superb, pure white; Queen, light blush; Rosy Queen, much richer than the preceding; Comet, brilliant red, Black Prince, very dark; Sulphurea, fine yellow; Rosea alba, pink stained with claret; and Rosea Grandiflora, light pink. Mr. Bragg, of the Star Nursery, Slough, also produced two trays of single blooms of Hollyhocks. A contrivance called a "Sulphurater," an instrument for distributing sulphur among plants, was exhibited by Mr. Fry, gardener to Mrs. Dent, Manor House, Lee, Kent. It is formed upon nearly the same principle as Brown's Fumigator, and, like that instrument, may also be used for fumigating. It promises to be a useful contrivance.

Caledonian Horticultural Society, July 6.—There was a fine display of exhibition articles, including magnificent collections of cut Roses. For Fuchsias (dark and light), the first premium was awarded to Mr. A. Walker, gardener to J. Mood, Esq., Rosehall, for fine plants of Dr. Jephson and Lord Sandon; Mr. W. Gordon, gardener to Capt. Williams, Campie House, Musselburgh, had Scarletina reflexa and Elisabeth. The prize for Tropical Orchids, was awarded to Mr. J. Thompson, gardener to Dr. Neill, Canonmills, the kinds being Cyrtochilum maculatum and Aërides crispum. For Stage, Fancy, and Scarlet Pelargoniums, the prizes were gained by Mr. A. Cameron, gardener to S. Hay, Esq., Trinity Cottage; his kinds were, Forget-me-Not, King of Saxony, Negress, Sir Walter Scott, Centurion, and Nestor; in the Fancy class, Queen Victoria, Maid of Anjou, and Maseppa Superb; and in Scarlets, well flowered plants of Tom Thumb and Queen Victoria. Mr. J. Rooney, gardener to Professor Dunbar, Rosepark, produced a plant of Achimenes Jaureguia; an honorary award, was properly made to Mr. Rooney for the same. The first prize for Pinks was gained by Mr. J. Henderson, gardener to C. K. Sivewright, Esq., Cargilfield, with Harriet, Goliah, Whipper-in, Twyford Rival, Morning Star, Lady Mildmay, Lord John Russell, Diana, Jenny Lind, Laura, Robinson, and Double X, all finely bloomed. A second was awarded to Mr. C. White, gardener to J. Russell, Esq., Arnotdale, Falkirk, for Lady Teazle, Queen Victoria, Oxoniensis, Lord Brougham, Whipper-in, Prince Albert, Pilot, Criterion, Laura, Henry Steers, Mary Ann, and Alfred Morrison. The highest flavoured variety of Strawberry, of recent introduction, shown by Mr. A. Lauder, Musselburgh, was Malcolm's Aberdeenshire. The prizes for Cherries were awarded to Mr. A. King, Inveresk; and to Mr. J. Thomson, gardener to Capt. Falconer, Carlowrie, both for Mayduke. Messrs. J. Dickson and Sons prize for the best twenty-four Roses (Moss, Provens, French, Perpetual, China, and Bourbon, four of each sort), was obtained by Mr. A. Sleigh, gardener at Lauriston Castle, whose kinds were, Moss—Common, Louise Collet, Princess Royal, and Laneii; Provens—Duchess of Kent, Devigne, La Sylphide, and Common; French—Grandissima, Belle Rosine, Surpasse-tout, and Julie d'Etanges; Perpetual—Comte de Montelivet, Duchess of Sutherland, Geant de Batailles, and Comtesse Duchatel; Hybrid China—Victor Hugo, Chenedole, Henri Barbet, and General Jacqueminot; Bourbons—Jaun, Abricote, Madame Roussell, Dupetit Thouars, and Bougere. Mr. J. Douglas, gardener to Sir T. Dick Lauder, Grange House; and Mr. Thomson, Carlowrie, likewise produced excellent stands of Roses. Of the articles sent, not for competition, many were contributed by nurserymen. Mr. Handasyde, Fisherrow, sent fine blooms of his seedling Duke of Perth Pansy. From the garden of Dr. Neill, came Francoa ramosa, with a collection of Alpine plants, including a double flowered variety of Sagina procumbens, the smallest double flowered plant known. I. Anderson, Esq., Maryfield, sent Pentstemon heterophyllum; S. Hay, Esq., a gorgeous specimen of Kalosanthes coccinea; J. Edmond, Esq., Newbank, a new large fruited variety of Red Currant. Among the plants from the Society's Garden may be mentioned an elegant specimen of Veronica salicifolia, bearing 520 spikes of flowers; and several very luxuriant and conspicuous plants of Humea elegans.

Victoria regia.—Mr. Spruce, who is now occupied as a botanical collector, in the countries where the Victoria grows, has recently given, in *Hooker's Journal of Botany*, an interesting account of its appearance in its native waters. He writes:—"We reached the igarapé, and were at once gratified by seeing the Victoria growing by the opposite shore of the igarapé itself. We were warned by the people not to go amongst the plants, as their prickles were venomous: but I got both hands and feet considerably pricked without experiencing any ill effects. We were fortunate in finding the plant in good flower, but, according to the testimony of all at Santarem who have seen it, the leaves attain their greatest dimensions in the winter. Captain Hislop assures me he has seen many leaves 12 feet in diameter, whereas the largest we saw measured a very little above 4 feet across, and they were packed as close as they could lie. But I can easily conceive how, in the wet season, their dimensions should be considerably augmented, for whereas at present the plant is growing in less than 2 feet of water, in winter the igarapé will be filled to its topmost banks, or at least 15 feet deeper than at present, while its breadth will also be greatly increased, so that the petioles of the Victoria, lengthening doubtless with the rise of the waters, will bring the leaves to a much greater surface, on which they they will have room to dilate to about twice their present size. The aspect of the Victoria in its native waters is so new and extraordinary that I am at a loss to what to compare it. The image is not a very poetical one, but assuredly the impression the plant gave me, when viewed from the bank above, was that of a number of tea-trays floating, with here and there a bouquet protruding between them: but when more closely viewed, the leaves excited the greatest admiration, from their immensity and perfect symmetry. A leaf turned up suggests some strange fabric of cast-iron just taken out of the furnace; its colour, and the enormous ribs with which it is strengthened, increasing the similarity. I could find no prostrate trunk as in the other Nymphæaceæ. The root is central, the thickness of a man's leg, penetrating deep into the mud (we could not dig to the bottom of it with our trésados), and sending out fascicles of whitish radicles, about 25, from below the base of each petiole, the thickness of a finger, and 2 feet or more in length. The radicles are imperforate, and give out here and there a very few slender fibres. From the same root I have seen flowers uniting the characters of Victoria regia and Cruziana (of the latter I have only the brief description in Walpers), so that I can hardly doubt there being the same species, as had been already more than suspected. The igarapé, where we gathered the Victoria, is called Tapiruari. I had two flowers brought to me a few days afterwards from the adjacent lake, which seems to have no name but that of the sitios on its banks: Mr. Jeffreys has also brought me flowers from the Rio Arrapixuna, which runs into the Tapajoz above Santarem, and in the wet season unites the Tapajoz and Amazon. I have further information of its growing abundantly in a lake beyond the Rio Mayaca, which flows into the Amazon some miles below Santarem. Mr. Wallace, who recently visited Monte Alegre, had a leaf and flower brought to him there; I have seen a portion of the leaf, which he dried. Lastly, I have correct intelligence of its occurring in the Rio Trombetas near Obidos, and in lakes between the rivers Tapajoz and Madeira, so that there can be no doubt of its being plentifully distributed throughout the whole of this region, both north and south of the Amazon." In addition to this we may add, that at the July meeting of the Botanical Society of Edinburgh Dr. Balfour read the following extracts from a letter of Dr. Campbell of Demerara, which accompanied seeds of the Victoria:—"I enclose seeds of Victoria regia, brought from the Essequibo a few days ago by an itinerant collector, who seems to know their value, as he charges a dollar (4s. 2d.) a dozen for them. I am afraid they will not germinate after their voyage across the Atlantic; but this at least you must bear in mind if you intend to try the experiment, that the plant will not live in an atmosphere within the influence of the sea breeze, nor grow in soil or water, where there is the slightest saline principal existing. Such at least is the result of experiments tried here. I visited the locality of the plant in the Essequibo, above 100 miles from the sea, in 1846, and it appeared to me a small lagoon, rather than a lake, over which the river flows in the rainy season. It is surrounded on all sides with a dense 'bush' (natural forest), through which we had great difficulty in dragging a small corial (wood-skin boat) in which we embarked on the lagoon, which is a most gloomy spot, the favorite resort of caymans, where the sun can scarcely penetrate even at noon, and with an atmosphere oppressively damp and hot. So far as I could judge by sounding and examining the stems of the plant, it appears to grow at a depth of 12 or 14 feet, in an oozy, slimy muddy sort of compound, with which I presume sand must be mixed, for higher up the river there are immense tracts of loose sand in the bed of the river, which must be swept along with the torrent every rainy season."

Hydrangea involucrata var. flore pleno.—All the species of this beautiful genus are welcome in our gardens. Every one knows the Hortensia (Hyd. Hortensia), the first species introduced to Europe. This elegant shrub was received from China, at the royal garden of Kew, in 1790, and from thence plants were obtained by some French cultivators, by whom it was soon extensively distributed. The plants produced first only small and few flowers, in consequence of its proper treatment being imperfectly known. But when subsequently they were grown in a peaty soil, and freely supplied with water in the period of their vegetation, they soon assumed a very different appearance, and their real beauty was discovered. This fact alone might teach us to abstain from pronouncing a decided opinion on the merits of a newly introduced plant before the proper method of treatment it has been proved by experiment. Many species of the same genus have since then been introduced, but these are not so beautiful as the old one. Their umbels are smaller, and the blossoms are less highly coloured; moreover, with the newer sorts, the large unfertile flowers are less numerous than in the old species, the umbels of which are almost compact. This monstrosity is apparently the result of long experimental culture in the Chinese and Japanese gardens, and it is scarcely to be doubted that ultimately the smaller flowers will be made to bloom as large and as profusely as the others. The beautiful species which has called forth these observations would seem to confirm this supposition. Its unfertile exterior flowers are double, of a bright rose colour. According to Siebold, who, however, does not appear to have introduced living plants of it, it grows on the highest mountains of the island of Niphon and Sikok, (Japan), where it flowers during the months of July and August. It is grown plentifully in the gardens of these parts, and forms a handsome plant, with a stem about three feet high. According to some travellers, there are four varieties of it; one lilac, the others with flesh-coloured, yellowish, and rose-coloured flowers. The leaves are opposite, rounded at the base, or nearly heart-shaped.—*Van Houtte's Flore des Serres.*

Liliam pumilum.—This forms a very desirable plant, although seldom seen in collections; it is very graceful and delicate, a little stiff, but very pretty on account of its ribbon-like leaves, which are narrow, shining, and deep green. The flowers are delicate, of a turban form, and lively red colour; the bud is agreeably shaded with brilliant purple, and marked with three green lines. Its native country appears to be Daourie (Asia); but M. Dietrich, in his *Synopsis Plantarum*, thinks it is Peru. M. Kunth, in his revision of the genus Lilium, places L. pumilum in the division of Martagon with leaves distant; he describes its flowers as fragrant. Perhaps the descriptions generally given of this Lily might bear some modification in regard to what is stated of the corolla being entirely glabrous at the interior. It is certainly not hairy, but there may be seen at the throat some small hair-like points, appearing like papillæ, which in other species become so large, and in which, after all, only hairs growing together are to be seen. "Here there is atrophy of these organs." It is grown in a rich vegetable soil in the open ground. In Daourie it grows in the prairies, and at the bottom of mountains. Daourie is a vast territory in Russia in Asia, at the east of the lake Baikal, inhabited by the Tartars. This region is called *Sakamennaia* by the natives, and is partly watered by the river Amur. On the banks of the Amur this Lily is frequently met with. The temperature of Daourie is that of the Alps, and vast forests of Pines are common throughout the country. These facts leave little doubt in respect to the hardiness of the Lilium. It may, however, be as well to take the bulbs out of the ground when the leaves are perfectly dry, and preserve them in a dry house during the cold season. They should be planted out in February. The flowers appear in May and June.—*Ann. de Gand.*

Carrotte rouge a collet vert, (Green crowned red).—As far as may be judged, after the short time it has been in cultivation, this variety appears quite interesting; it is very long, almost cylindrical, and appears to be productive. In colour it is a little paler than the *Carrotte rouge pale de Flandre*, and comes nearer orange than red. From a desire not to give it a fresh name we have retained that by which it is known in Belgium, although, in some respects, it conveys but a very inexact idea of its colour.—*Revue Horticole.*

GONGORA MACULATA, VAR. JENISCHII.

Nat. Order, ORCHIDACEÆ.

GENERIC CHARACTER.—Gongora, *Ruiz and Pavon*. *Perianth* expanded. Lateral *sepals* free, divaricated, the upper one connate with the back of the column. *Petals* smaller, adnate to the middle of the column. *Labellum* continuous with the base of the column, free, clawed, the spreading hypochilium horned on both sides, the epichilium vertical, laterally compressed (opposite faces complicate, connate), acuminate. *Column* very long, arcuate, clavate, margined. *Anthers* sub-two-celled; pollen-masses two, linear, sessile on a cuneate caudicula.—Epiphytous herbs, with pseudo-bulbs. Leaves plicate. Racemes very long, flexuose, many-flowered.

GONGORA MACULATA, Lindley.—Leaves five-plicate, obovate-oblong, very much narrowed at the base; lateral sepals narrowed from a wide base; hypochilium oblong, convex beneath, obtusely two-horned at the base, the apex truncate with acute angles prolonged into two cirrhi; epichilium acuminate.—*Lindley*, *Bot. Reg.*, xix., t. 1616.

Var. Jenischii.—Jenisch's Gongora.—Leaves more elongated (?); perianth and column coloured alike, yellow, finely mottled with reddish brown; peduncle and pedicels green.

SYNONYMY.—G. Jenischii, *of the gardens*.

DESCRIPTION.—An epiphyte, with large oval, angled, or furrowed bright green pseudo-bulbs. Leaves plicate, lanceolate-ensiform, much narrowed below and acute above. Peduncle very long, green, with distant embracing reddish brown linear bracts; pedicels long, flexuose, green. Raceme many-flowered, long, pendent, with large spreading flowers. The upper sepal adherent about half-way up the column, linear, lanceolate, acuminate; the edges reflexed; lower sepals larger, obliquely triangular, acute from a broad base, edges rolled back. Lateral petals linear, adherent half-way to the back of the column, not so long as the upper sepal. Labellum continuous with the base of the column, free, clawed; the lower part (hypochilium) arched, and laterally compressed, with a pair of petaloid processes on the back of the midrib, truncate above, with two angles bearing thread-like processes; the upper part (epichilium) acutely elongate ovate, with the sides folded together face to face, attenuated to a point above. Column very long, semi-terete, arched, thickened upwards, adherent in half its length to the upper sepal and lateral petals. Perianth and column all of like colour, yellow, with fine deep mottling or blotches, darker towards the edges and points.

HISTORY.—Gongora maculata seems to be very variable in colour, and we can find no other point by which to distinguish the form here described.—A. H.

For the opportunity of figuring this very showy plant we are indebted to the kindness of S. Rucker, Esq., jun., of Wandsworth, who received it from his friend the Senator Jenisch, of Hamburgh, who had imported it some years back from Venezuela. It flowered in the rich collection at Wandsworth during the present summer, when our drawing was made.

CULTURE.—The following remarks upon its cultivation are by our friend Mr. Goode, one of the most successful cultivators of Orchids in the country, and by whom, when resident in Germany, the distinctive name here adopted, was given, in compliment to the Senator Jenisch, in whose matchless collection it first flowered. The plant may, perhaps, be a true species.

"Like all other Gongoras, this beautiful variety is of very easy culture; but, as in the management of all easily-grown plants, there are a few points which must be attended to, in order to insure, in the greatest perfection, the development of its graceful pendulous racemes of flowers, which, under good management, sometimes attain the length of five feet. It is admirably adapted for growing upon blocks of wood, in fancy pots, vases, or baskets suspended from the roof of the Orchid-house, in which position its gay and singular insect-like flowers have a very interesting appearance. This Gongora should be planted in good fibrous peat soil, or in sphagnum moss, liberally intermixed with broken crocks and charcoal. At the time of potting, elevate the plant slightly above the rim of the pot or basket, and take care to make the potting material quite firm, and fix the mass, if necessary, with a few slight pegs. While the plant is in a dormant state it must be kept comparatively dry, until it starts naturally, and without any unusual excitement, into growth, at which time the soil must be soaked for a few minutes in warm water, so as to get it properly moistened; but take care that no water, from drip or otherwise, gets into the new shoots until the pseudo-bulbs are properly formed, after which copious syringing may be resorted to with considerable advantage. This treatment must be continued until the growth is completed, by which means you will increase the size of the pseudo-bulbs annually, and obtain an increased supply of flower spikes. Being very fast growers, the plants require to be divided every fifth or sixth year. During the growing season a brisk moist heat is necessary, but through the blooming and dormant season a rather low and comparatively dry temperature is preferable."—A.

ON THE SUMMER TREATMENT OF ROSE-STOCKS, AND THE SEASON FOR BUDDING THEM.

By Mr. J. Saul, Durdham Down Nurseries, Bristol.

It may not be unacceptable to offer a few remarks on the summer management of Rose-stocks, with a hint or two on budding the same, seeing to what an extent Roses are now annually budded, not only by the nurserymen but by amateurs. It is for the latter class especially that these few remarks are intended. Every observer of this favourite flower must be struck by the immense number of Rose-stocks collected every winter; not for nurserymen alone, for great quantities find their way into the small gardens alike of the country cottager and town tradesmen. The number of the latter in the environs of every town and city in this country at the present day, who cultivate Roses and bud their own plants, is really prodigious; and we ought not to be surprised at this when we consider how enchanting and delightfully pleasing are flowers of every description, and more particularly the Rose. The tradesman, who is confined to business in town all day, spends with delight his few leisure hours, during the morning and evening, with his favourite flowers—those gems of nature. To tend them with care is his greatest pleasure, and, if he is fortunate in budding his favourite Roses, what a source of gratification is it to him! How amply does he consider himself repaid! It is to assist in his pleasing occupations that the following remarks are offered.

I shall suppose the Rose-stocks to have been collected during the past autumn, or not later than the beginning of January; to have been trimmed pretty closely at the root, cutting off all knots or decayed parts, and leaving but little of the old stump or stool; the stem to have been cut to the required height, a short distance above an eye sloping a little from it; and to have been planted in rich well-prepared soil, where they soon emit abundance of fibres, and through the following summer produce abundance of young shoots, which are to be operated upon in budding. These young shoots, whatever may be their number or strength, should all be allowed to remain on the stock, and not thinned out or shortened in the least. I am fully aware that amateurs, and some extensive *Rose growers*, trim up their stocks during summer to the few branches which are intended to be budded upon; and in many instances shorten even these. Many works which give directions on Rose growing recommend the same *barbarous practice*. To me it appears surprising how any person acquainted with the mere rudiments of Vegetable Physiology should recommend or do any act so much in opposition to the immutable laws of nature, as this practice indubitably is. Ask those who recommend or practice this system, what their object is in doing it, and they will in all probability say, in order to strengthen the stock, and buds, which are inserted. Follow this question up, and inquire in what way does it strengthen the stock or buds? Is this to be effected by destroying the branches with their foliage—the latter the lungs and stomach of the plant! A strange way this would be considered in the animal kingdom, and it is precisely as absurd in the vegetable.

If there is naturally a reciprocating action carried on between the roots and leaves, it follows if this action is cut off by destroying a considerable portion of the latter, the general health of the stock must be impaired. Now this is what is done by trimming and shortening the branches, the sap which is propelled into the stem and branches, (for want of the foliage which is cut off,) is neither digested nor assimilated, but remains in the cells of the stock in nearly the same crude state in which it was sent up; the consequence is that the following spring when the buds attempt to grow, stock and all dies off. This will take place to a great extent if the Roses which have been budded are of some of the delicate Bourbons, Chinas, Teas, &c. When such as these attempt to shoot out in spring, being in their nature delicate, and the stock unhealthy from the previous summer's rough treatment, they will, after making shoots a few inches, die off in great numbers. I have seen whole lines of worked plants die off the first season after working, from this cause, and this only; whilst the same varieties, under similar circumstances, save that the branches were neither trimmed nor shortened, have grown vigorously without a single failure. If the varieties budded are of a strong vigorous nature, they may grow on pretty well, though not so well as if the branches had neither been trimmed nor shortened.

One advantage, (or rather what some consider as such, though it is in fact the contrary) arising from the practice here condemned, is that the buds will frequently grow out the same season;

and this the amateur considers a great point, or in other words a season gained. Such however is not the case, as the following season when headed back close as they should be, the shoots never break so strong or vigorous, or make such good growth as the same varieties when they grow from dormant buds: the stocks being left unpruned when budded.

My plan is to leave all stocks, however strong or rude, to grow—if I may so term it—wild the first season, putting neither knife nor anything else near the shoots; and, at budding time, only removing any leaves or thorns that may be in the way. Some may imagine that the buds will not take so well in this way; they will, however, take incomparably better than if the stocks had been pruned; for, the action carried on by the leaves and roots being unimpeded by the pruning knife, the plants are in vigorous health, and the buds as a consequence take freely. When pruned and shortened, either before or at the time of budding, the check which the stock receives is very prejudicial to the union of the bud and stock.

After budding, the stocks will require no further attention until the buds have fairly taken, when they should be untied, leaving all the branches at full length up to the beginning of March. Then all should be pruned close in, except those which are budded; these must be shortened back to about six inches from the bud. Managed in this way, it is surprising what luxuriant shoots and heads the strong-growing hybrid Perpetuals, Bourbons, &c., will make the first season from the bud, which may be accounted for when we consider how the stock was allowed to grow wild, and gather strength the previous season.

Roses may be budded at various seasons; much will depend on the condition of the stock and buds, &c., as well as the varieties of both. The Dog Rose, which is in most general use as a stock, is best worked in July or August; it may be worked earlier, but there is no advantage in so doing, but rather the contrary, as the buds are likely to push the first season; and, as I have already noticed, these never answer so well as the buds which remain dormant. They may also be budded through September; but, in this case, much will depend on the free growth of the stocks and buds, as well as weather. All these conditions favourable, I have worked them as late as the middle of October, with perfect success. All things considered, however, the two months I have named are best for working this stock. Provence, Moss, Gallica, Damask, Alba, Austrian, and any other of the classes of summer Roses which perfect their growth early are best budded at this season.

Those stocks, on the contrary, which grow luxuriantly and late, such as Manettii, Crimson Boursault, &c., are better worked from the beginning to the middle of September, or indeed any time through the latter month, provided the stocks are growing freely and the weather is clear and warm, under which circumstances they will take freely. The classes which succeed best at this season are Perpetuals, Bourbons, Noisettes, Chinas, Teas, &c.; in a word, all the autumnal Roses which are late growers, and for which the Manettii stock is so well suited from its continuity of growth. Worked early upon these strong stocks the buds generally perish, from the watery nature of the shoots. As soon, however, as the shoots begin to get a little firm, the bark still rising freely—which will be about the time I have named (September)—the buds will succeed admirably. Autumnal Roses, of the classes just mentioned, when intended for standards and worked on the Dog Rose, are best budded at the same time as the summer Roses—July or August. Provence or Moss Roses worked upon the Manettii, or any free-growing stocks, will be much more manageable in the forcing-house in spring, as well as for pot-culture in general.

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PROFESSIONAL AND MORAL TRAINING.

HINTS ADDRESSED TO YOUNG GARDENERS.

By Mr. W. P. KEANE, Author of "The Beauties of Surrey," &c.

I AM happy to hear that you are now engaged in a regular course of instruction under one of the very best gardeners in England, and in a place celebrated for good keeping, extent, and variety. The good keeping, or superior management of a place, even of small extent, is of more advantage to a young man than a large place badly kept. When I say of small extent, I mean a place where a young man will have an opportunity of seeing some portion of the various branches of his profession carried into operation, something more than the usual practices to be seen in a gentleman-farmer's garden.

The order, regularity, and spirit of improvement manifested in, comparatively speaking, such small places are far preferable to that of many extensive places, where multifarious employments give but little time for particular investigations into the why and wherefore of the natural agents by which vegetation is influenced. But my present object is to point out to you the necessity of adopting, a regular plodding system of study, not one taken up on the spur of the moment, produced by some extraneous influence, but a continuous system of keeping the mind employed upon subjects connected with your profession—a profession that particularly comprehends the great and unerring laws of Nature.

Books are useful; but a gardener, above all others, can at all times study the book of nature, which is always open, and always ready to reward him who reads her language aright, with a never-ceasing supply of interesting and useful instruction. To obtain some degree of professional skill he must be a persevering, an acute, and an accurate observer of nature, and to be regular and methodical in all his observations. I must admit that it is rather difficult to be regular and methodical at all times; but we ought to try to be so. Circumstances may sometimes prevent us, but the fault generally lies in our own idle dispositions; irregularity is more commonly wilful than contingent on things exterior; it is a most injurious defect in the human character. Those who are cursed with it, and many who are not, fancy that it is the sure concomitant of great ability, the mark even of that nondescript called a "genius." The humble classes in particular suppose that every clever workman must

"Move eccentric like a comet's blaze."

Dreadful opinion, followed by fatal effects. You have read in "Æsop's Fables" of the hare and the tortoise—the irregular hare with all his swiftness, his genius as it were, was beaten by the slow tortoise, or, so to speak, the regular man. We see every day the human hare outstripped by the human tortoise. We see irregular swiftness of intellect, and expertness of hand beaten hollow by the moderate but regular and steady mind, and by the slow but persevering hand. In short, we see irregularity and unsteadiness prostrate, regularity and persevering industry triumphant. The one pitied, neglected, and despised; the other valued, cherished, and at a premium. The former, who could have attained fame, wealth, pre-eminence, and had probably in some daring dash of energy nearly attained them, we see plunged in the slough of despair and disgrace, because the proper energy was not sustained, and vaccillation crept in; the latter we see crawling on, and arriving by regular progression at the summit the far cleverer competitor had lost by foolish deviations, and stoppages by the way. The most brilliant abilities, the most splendid acquirements are next to valueless when firmness of purpose is wanting; whilst, on the other hand, moderate talents, lowly acquirements, acting upon the principle that "where there's a will there's a way," obtain the highest price in the market of utility and prosperity. Be then regularly plodding, and you will have no cause to envy the ephemeral success of wayward ability.

I have said that gardeners especially should study the book of nature. There, especially, is manifested the beneficence of the supreme Creator, who has given for our admiration a succession of flowers of various sorts and colours throughout the whole year. That nature is never chary of her gifts, is made manifest in the many vegetable productions that she so liberally bestows upon us at all seasons. From their appearance at particular periods, and these with the regularity of the returning seasons, we do not appreciate their beauties so much as we ought. To suppose that the vegetative principle had ceased to act for one year would, by the absence of our old favourites, give us some idea of the delights and pleasures of which we were deprived; the returning spring would bring forth no flowers on which to feast our eyes, summer no fruits to gratify our tastes, autumn no various grains so necessary for human existence—all would be winter, dreary, and unproductive, a cessation of nature that would prove most disastrous in its consequences.

You can easily picture to yourself the awful consequences that would result from the cessation of vegetation for even one short year; but in wisdom it is ordained by the Great Father of all that no such calamity should happen; the returning seasons are to continue to bring forth the leaves, the flowers, the fruits, &c., natural to each of all the various productions with which the surface of the earth is bedecked: there is an endless variety of different sorts, a variety of foliage, and a variety of colours. The more minutely such observations are made, the more plainly are seen the various tints shades, colours, and forms with which the Great Author of Nature has produced his works for our admiration, gratitude, and advantage. From such investigations your own reflection should lead you to trace "the works of nature up to nature's God."

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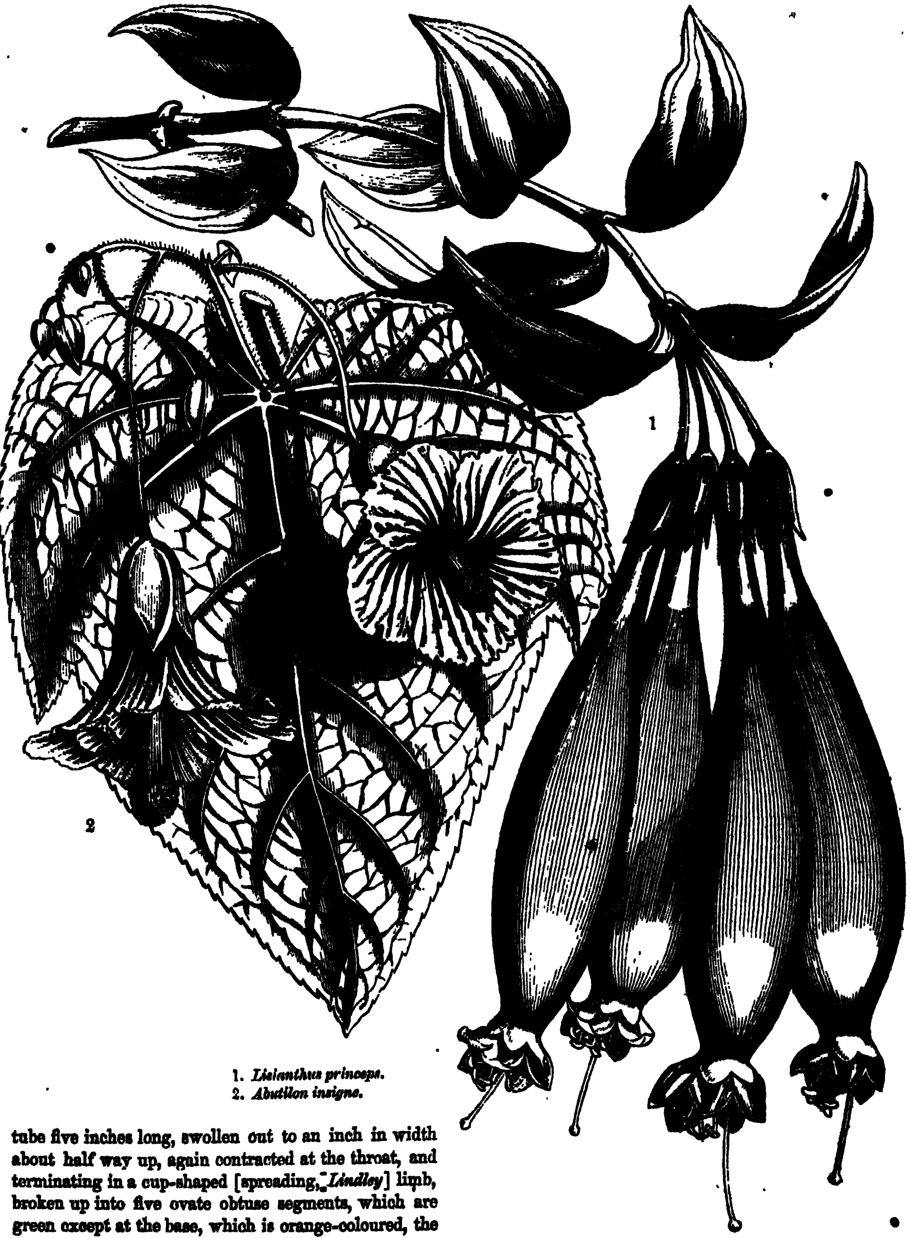
New and Rare Plants.

LISIANTHUS PRINCEPS, *Lindley*. Prince of Lisianths (*Flore des Serres*, t. 557).—Nat. Ord., Gentianaceæ § Gentianeæ.—A greenhouse shrub of great beauty. It grows naturally compact, two to three feet high, with dichotomous sub-four-angled branches, and is smooth in every part. The leaves are opposite, lanceolate-oblong, acuminate, with two pair of lateral nerves, and a very short footstalk. The flowers grow at the tips of the branches in small sub-umbellate clusters [singly from the axils of the leaves, *Lindley*]; they are nodding, with a



1. *Lisianthus princeps.*
2. *Abutilon insigne.*

tube five inches long, swollen out to an inch in width about half way up, again contracted at the throat, and terminating in a cup-shaped [spreading, *Lindley*] limb, broken up into five ovate obtuse segments, which are green except at the base, which is orange-coloured, the tube being represented as orange-red. From their size and colour they must be very showy. From Colombia: mountains of Pamplona, at from 10,000 to 11,000 feet altitude. Introduced to continental gardens by M. Linden, through his collector, M. Schlim. Flowers in? M. Van Houtte observes, that "a greenhouse is the most suitable place for it. The plants may be grown in a free loamy soil, the pots being well drained; for, in the early part of the growing season, they must be freely supplied with water. They are easily propagated by cuttings placed under a hand-glass in the usual manner, and may also be raised freely from seeds sown on the surface of the soil in pots or pans, and kept watered with a fine rose; as they grow they may be pricked singly into small pots, and placed in a frame, or the shelf of a greenhouse." Though recommended to be grown in a greenhouse, they require complete protection from a low temperature in winter.

ABUTILON INSIGNE, *Planchon.* Remarkable Abutilon (*Flore des Serres*, t. 551).—Nat. Ord., Malvaceæ § Sideæ. —A charming greenhouse shrub of vigorous growth, thriving in the open ground during summer, and well adapted for a cool conservatory. The young branches are clothed with dense stellate rufous down. The leaves are large, on long petioles, alternate, cordate, somewhat three-lobed, and coarsely serrated, palmato-seven-nerved, with reticulated veins. The flowers are about two inches in diameter, and grow in axillary racemes of three to seven flowers; the calyx is campanulate, with triangular acute lobes; the corolla consists of five obovate cuneate petals, crisped, and plicate with erose margins; they are of a lively rose-colour, with deeper coloured veins. From New Granada: mountain regions. Introduced to continental gardens by Mr. Linden, through his collectors, M.M. Schlim and Funck. Flowers in the autumn.

ARCTOCALYX ENDLICHERIANUS, *Fenzl.* Endlicher's Arctocalyx (*Flore des Serres*, t. 546).—Nat. Ord., Gesneraceæ § Gesnereæ.—A remarkably looking, shaggy epiphytal shrubby plant of some beauty, requiring a cool humid stove. The stems are stout, generally simple, five or six feet in length, rooting, purplish, covered thickly with long shaggy greyish hairs. The leaves are opposite, broadly elliptic, acuminate, unequal at the base, velvety from the presence of long soft hairs. The flowers are axillary on short stalks, solitary or from two to five in a sub-umbellate fascicle; the calyx is tubular-campanulate, shaggy, nearly an inch long; the corolla, which is golden yellow, extends about two inches beyond the calyx, and is hairy on the outside, smooth within; the tube curved, broadest upwards, dividing into a limb of five broad nearly equal lobes, which are fringe-toothed on the margin, and marked on the face with lines of brown-purple spots. The name is constructed in allusion to the shaggy ursine appearance of the calyx. From Vera Cruz: forests of Mirador, elevation 2000 feet. Introduced to Berlin, in 1847, by M. Abel, having been discovered by C. Heller. Flowers in? It should have the treatment given to other semi-epiphytal shrubby stove Gesneraceæ.

ONCIDIUM SERRATUM, *Lindley.* Serrated Oncid (*Paxt. Fl. Gard.*, i. 28).—Nat. Ord., Orchidaceæ, § Vandeæ-Brassideæ.—A curious epiphyte. The pseudo-bulbs are oblong, smooth, terete, each bearing two broad sword-shaped leaves at their points, and several others below them. The flower stem grows nine feet long, partly twining, with five or six lateral branches, each bearing four to six moderate-sized flowers, the divisions of which are crisped and serrated at the margin, brownish olive, the upper half of the petals of a clear bright yellow.—From Peru. Introduced to Paris in 1848. Flowers in winter and spring.

AOTUS CORDIFOLIUS, *Bentham.* Heart-leaved Aotus.—Nat. Ord., Fabaceæ § Papilionaceæ Pulteneæ.—Syn: Gastrolobium Hugelii, *of gardens.*—A pretty greenhouse bush with heart-shaped leaves arranged in threes, and axillary yellow papilionaceous flowers, of large size and very numerous. From Swan River. Introduced about 1847. Flowers in summer. Messrs. Knight and Perry (see *ante*, i., 161).

ADENOCALYMMA COMOSUM, *De Candolle.* Hop-flowered Adenocalymma (*Bot. Mag.*, t. 4210).—Nat. Ord., Bignoniaceæ.—Syn: A. nitidum, *Lindley, in Paxt. Fl. Gard.* i., t., 2, *according to Hooker;* Bignonia comosum, *Chamisso.*—A very pretty stove plant, with smooth climbing stems. The leaves consist either of three leaflets, or of two, with an intermediate tendril, the leaflets being elliptic-oblong or ovate, shining, and seated on short stalks. The flowers grow in axillary, or nearly terminal crowded racemes; "which are at first so densely clothed with large concave bracts, as to look like the large aments of the Hop; these fall away before the corollas expand." The corolla is trumpet-shaped, two inches long, of a leathery and rather a velvety texture, and deep yellow colour; its tube is narrow at the base, enlarged upwards into the spreading or somewhat recurved limb of five nearly equal rounded lobes. From Brasil: in forests. Introduced in 1841. Flowers in February. Messrs. Knight and Perry, Exotic Nursery, Chelsea; and Royal Botanic Gardens, Kew.

Review.

Die Flora der Bodenseegegend. Von Dr. M. H. HÖFLE, etc., etc. *The Flora of the Lake of Constance.* By Dr. M. H. HÖFLE, Lecturer on Botany in the University of Heidelberg. Erlangen: 1850.

LATELY reading the Memoirs of the Prince de Ligne, we were much struck with a passage in which he affirms that the love of flowers is the only passion that does not decrease with the approach of age. The Prince is right; and he might have added, that there is no pursuit better calculated than Botany to inspire youth or age with a love of virtue. We cannot conceive it possible for a botanist to be anything but a good man. He must be amiable, and pious, and devout; for his pursuits naturally awaken religious feelings within him, and cannot but be associated with ennobling and lofty sentiments. And then its pleasures—the wilderness of thorns and brambles—the bald and burnt moor—the marsh's sedgy shallows, where docks, bulrushes, and water-flags choke the rank waste—as well as the richest and most cultivated pastures—all yield them alike abundantly.

But we are neither going to dilate upon the delights of Botany nor the excellencies or defects of a German work. We merely offer the latter as a model to be followed by those who love the former, and unselfishly desire to aid in the spread of knowledge, as well as to gratify their own propensities for the beautiful and the rare. It is much to be regretted that local Floras are not general in England. In Germany there is scarce a village that does not possess some record of the natural productions of its neighbourhood, and the work before us is only one of the many similar to it that we have seen. It is alone by records such as these, than an accurate knowledge of the natural history of a country can be obtained; and in Botany especially, we cannot too strongly insist upon the importance of such catalogues, in assisting to make us acquainted with the habits of plants, their geographical range, and the soils which they affect. While we cannot but regret we have not many Dr. Höfles in England, we will relate the plan he has adopted, trusting it will find followers; and briefly premise that the Lake of Constance—better known in Germany as the "*Bodensee*"—and to the classical reader as the "*Lacus Brigantinus*"—is a great expanse of water situated in the north-eastern corner of Switzerland. It is bordered by the territories of five states, Baden, Wirtemberg, Bavaria, Austria, and Switzerland; it is about 90 miles long, 9 wide in its broadest part, nearly 1000 feet in its greatest depth, and lies 1255 feet above the sea. Its great tributary is the Rhine, which enters at its eastern extremity, and flows out beneath the walls of Constance. At its upper end is an extensive and annually increasing delta. Its banks are flat or gently undulating, and more distinguished for their fertility than their picturesque beauty. Where the great river enters it, however, there are some alpine features, and there a glimpse is caught of the snow-capped Borarlberg. Some parts of it thus may be called the garden of Switzerland. It is a richly cultivated arable land, waving with corn in autumn, and in spring redolent with the beauties of the blooming orchards. Nor are its waters less rich. They contain about sixty species of fish—we forget the exact number—but we can never forget a gigantic pike (*Esox Lucius*) we once saw from them; it was nearly five feet in length, and we doubt not it may even now be seen adorning in its glass case the coffee room of the "*Hecht Hotel.*"

We think Dr. Höfle's plan well worthy of imitation; it is not only a list of plants with their habitats, and time of flowering, but a scientific sketch of the vegetation of the district, including notices of its elevation above the level of the sea, the distribution of its streams and forests, its geology, state of agriculture, its average temperature, humidity, and lastly though not of the least importance, a comparison between its Flora and that of other localities. We wish some of our readers would give us their views as to the best form of a Flora. If they do not, we may probably ourselves offer a few remarks.—J. S. B.

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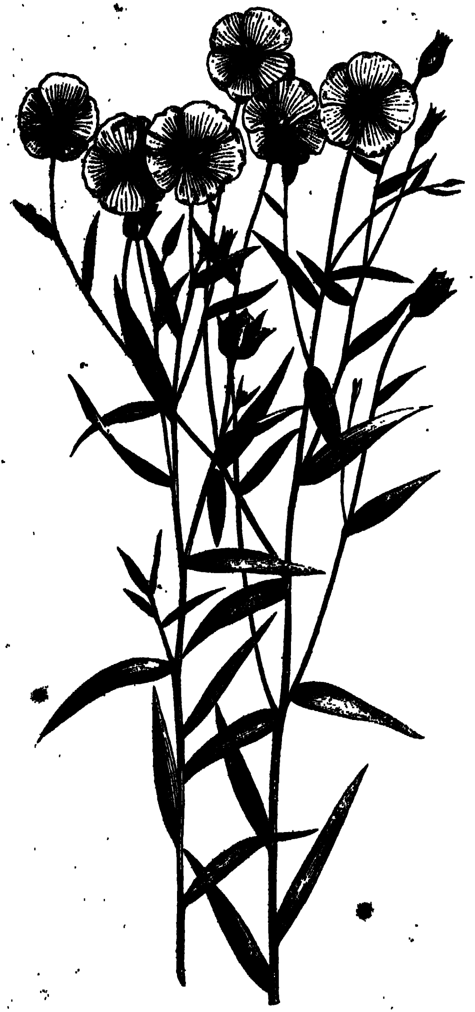
Sacred Botany.—Flax.—Linen.

BOTH the plant Flax, Linum usitatissimum of botanists, and its product, linen, are mentioned several times in our bible. There seems, indeed, no doubt whatever, that the Hebrew *pishtah*, translated Flax, is the plant so called. Some proof of this may be gleaned from the passages in which the word occurs. Thus, during the Egyptian bondage of the Israelites, in the plague of the hail-storm, it is said (Exod ix. 31), that "the Flax (pishtah) and Barley was smitten: for the Barley was in the ear, and the Flax was bolled."—that is, according to Gesenius, in blossom. It is added, "the Wheat and the Rie were not smitten: for they were not grown up." These statements agree with a practice which existed in Egypt, as in India, of sowing these grains, partly in autumn, and partly in spring, so that it is easily to be conceived that Wheat might be but little advanced in blade, while the Barley and Flax were much more advanced. That the plant must have been cultivated in Egypt there is proof; both in the clear and undoubted representations of Flax culture which occur in the paintings of the grotto of El Kab, and in the fact that the mummy-cloth is almost universally found to have been made of linen. Linen, moreover, was long one of the staple exports of Egypt; and the workers of fine Flax, that is, the manufacturers of fine linen, incidentally alluded to in the history of King Solomon—who "had horses brought out of Egypt, and linen yarn, the king's merchants receiving the yarn at a price" (1 Kings, x. 28)—are expressly mentioned by Isaiah in his denunciation of the burden of Egypt, thus: "Moreover they that work in fine Flax . . . . shall be confounded" (Isaiah xix. 9). Still further evidence of the identity of *pishtah* and Flax is afforded by that familiar text of Isaiah (xlii. 3): "the smoking Flax shall he not quench," which is evidently quoted in the New Testament (Matt. xii. 20), where *linon* (linum) is put as the equivalent of *pishtah*, the term which Isaiah employs.

It has been already mentioned that Flax was extensively cultivated and manufactured in Egypt. So it must have been in Palestine; for, when the spies were sent from the camp of Israel to Jericho, and search was made for them by the men of that city, a woman named Rahab "brought them to the roof of the house, and hid them with the stalks of Flax, which she had laid in order upon the roof" (Josh. ii. 6). In the time of Samson, Flax must have been in common use, and well known among the Philistines; for we read, "they bound him with two new cords . . . . the cords that were upon his arms became as Flax that was burnt with fire" (Judges xv. 13, 14). At a later period, in the days of Solomon, Flax-spinning was still familiar, for it is recorded as one of the characteristics of the good and virtuous wife whose "price is above rubies," that "she seeketh wool and Flax, and worketh diligently with her hand . . . . she layeth her hand to the spindle, and her hands hold the distaff . . . . she maketh fine linen and selleth it" (Prov. xxxi. 13 *et seq.*)

Linen cloth is so frequently mentioned in the history of the Jewish nation, that it must have been an article of common use among the people, and there is every reason to believe it was home-manufactured. When Moses constructed the tabernacle in the wilderness, it is said that "all the women that were wise-hearted did spin with their hands, and brought that which they had spun, both of blue and of purple, and of scarlet, and of fine linen." Bezaleel and Aholiab were also filled "with the spirit of God in wisdom . . . . to devise curious works . . . and to work all manner of work . . . in fine linen and of the weaver." "And every wise-hearted man among them that wrought the work of the tabernacle, made curtains of fine twined linen, and blue, and purple, and scarlet." "And they made coats of fine linen of woven work for Aaron and for his sons, and a mitre of fine linen, and goodly bonnets of fine linen, and linen breeches of fine twined linen, and a girdle of fine twined linen." (Exod. xxxv. *et seq*). Various other texts, scattered throughout both the Old and New Testament writings, make mention of linen and fine linen as furnishing articles of clothing, or of common domestic use.

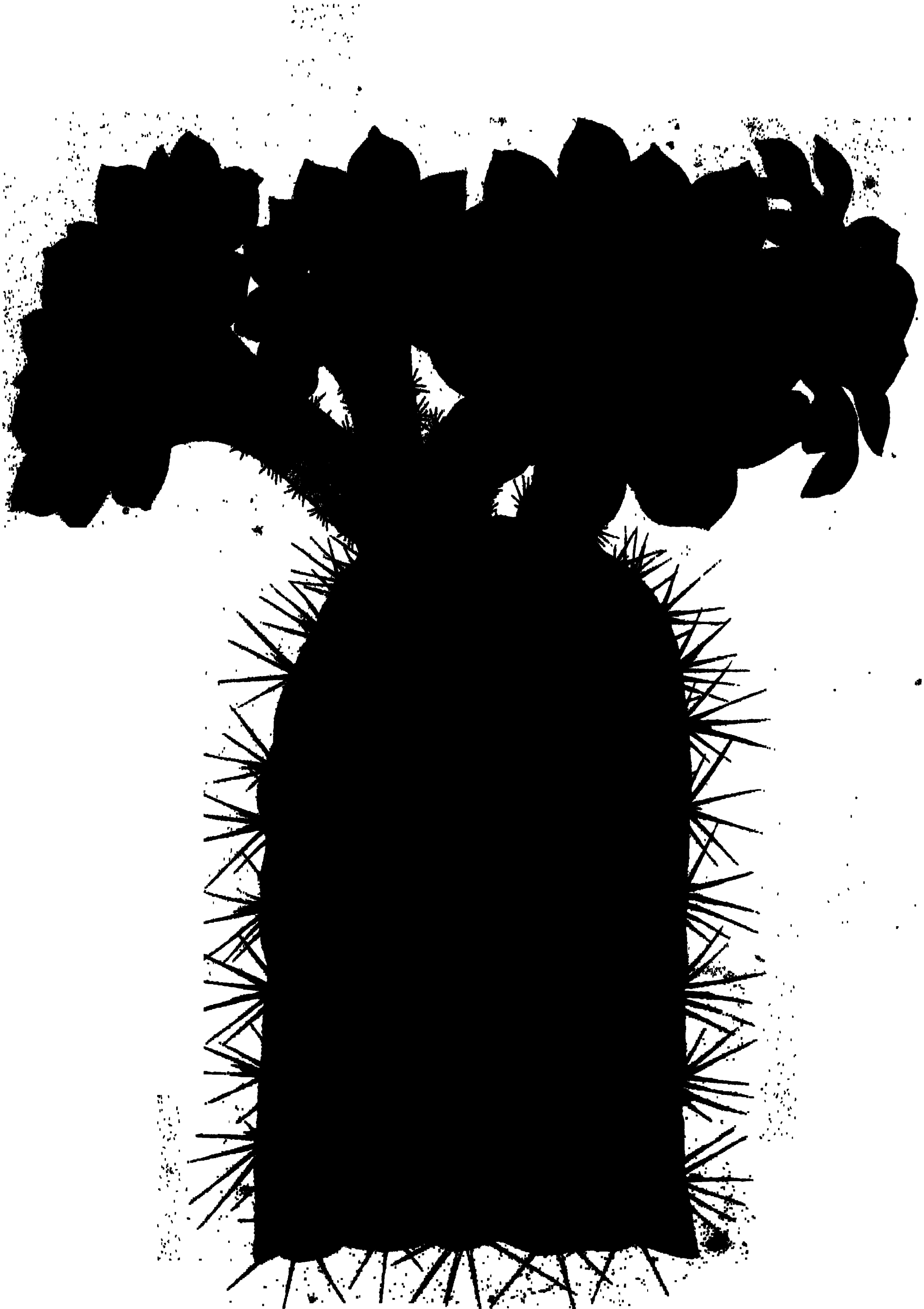


LINUM USITATISSIMUM.

The common Flax, Linum usitatissimum, is an annual of erect habit, growing two or three feet high, with round, smooth, finely striated, leafy stems, mostly much branched in the upper part. The leaves are smooth, sessile, bright green, lance-shaped, and alternately seated on the stem. The inflorescence forms a leafy panicle; the flowers solitary, on slender peduncles, consist of five, broadly ovate petals, of a fine purplish blue, marked with branched veins. These flowers are produced about July, and continue for some time to have a very ornamental appearance, rendering it a desirable border flower.

But Flax is, after all, more useful than ornamental. The tenacious fibres of the stem, when cleared of the bark and cellular substance in which they lie, and after being dried and beaten, form the commercial Flax which is made into linen. This fibrous substance is very tenacious and durable, rendering it capable of being spun into extremely fine threads, and woven into the most delicate fabrics. These fibres or threads have a most beautiful appearance under a high magnifying power—even the finest filaments being seen to be composed of an aggregation of fine tubes.

We shall, in conclusion, briefly enumerate some of the principal uses to which the common Flax plant is applied :—Its use in the manufacture of linen is well-known, and already mentioned. Besides this, its seeds yield, by expression, an oil which is largely employed in the arts (linseed oil). The inferior seed, when boiled and prepared, forms a very nutritious jelly-like fattening food for cattle; the refuse of that which is crushed to obtain the oil also yields for animals a nutritious food in the well-known form of oil-cake. The seeds (linseed) are emollient and demulcent; ground into meal, they are used in cataplasms; in infusion they yield a valuable pectoral drink. The proportion of mucilage and fixed oil in the seeds is about one-fifth of the former, and one-sixth of the latter. The oil, mixed with lime-water, has been a favourite application to burns.—M.



CEREUS LEEANUS.

Nat. Order, Cactaceæ.

Generic Character.—Cereus, *Haworth.* *Perianth* multiple, the base of the tube connate with the ovary, elongate-campanulate; *calycine segments* sometimes numerous, arising spirally from the tube, from setiferous axils, sometimes few, the tube naked below; *petals* numerous, in many rows. *Stamens* inserted irregularly on the tube, shorter than the corolla; *filaments* filiform; *anthers* oblong. *Ovary* inferior, one-celled, with many-ovuled, parietal placentas; *style* filiform, surpassing the stamens; *stigma* divided into many linear lobes. *Berry* ovoid, areolated, with scales or tubercles from the persistent calycine segments, one-celled, pulpy, the parietal placentas appearing like veins in the pulp. *Seeds* numerous, imbedded in the pulp. *Embryo* exalbuminous, with free foliaceous cotyledons, and a round obtuse radicle.—(*Endlicher*, *Gen. Pl.*, 5157.)

Cereus Leeanus, *Hooker*. Lee's Cereus.—Erect, about a foot high, conical-cylindrical, subacute, 12-14 ribbed; areolæ approximated, pulvinate, tomentose, about 12-spined; spines or thorns acicular, very unequal, strict, dusky, the exterior 2-3 lines long, the central one inch long; flowers sub-terminal, showy, brick-red; calycine scales green at the apex, retuse; petals obovate-oblong acute.

Synonymy.—C. Leeanus, *Hooker* in *Bot. Mag.*, t. 4417.

DESCRIPTION.—Plant succulent, about a foot high, and four inches in diameter, tapering upwards from a nearly cylindrical base; furrowed throughout its length rather deeply and acutely, forming elevated rather sharp ridges or angles, which are studded at short intervals by small, dense, cushion-like tufts of wool, bearing the cluster of (about twelve) sharp needle-shaped aculei, straight, very irregular in length, the outer series being the shortest, and gradually lengthening, till the central, longer and stouter than the rest, is about an inch long. The flowers large, produced at the summit, brick-red, inclining to blood-colour; the tube is green at the base, then yellowish orange, clothed with oblong fleshy scales, acute, tipped with green, and bearing at the point a tuft of aciculi or bristles; these scales pass rather suddenly into petals of an oblong obovate-acute form, spreading and imbricated. Stamens numerous, rather longer than the tube. Style columnar; stigma green, of many erect or connivent rays.—H.

History, &c.—Our drawing of this, one of the most beautiful of all the dwarf Cacti, was made from a plant obligingly communicated by Messrs. Lee, of Hammersmith, in June last. The same plant, which was present at the Royal Botanic Society's Exhibition, there received, as a just tribute to its merit, one of the highest awards made in the class of new plants. Independently of the great beauty of the blossoms, they have the additional recommendation of being produced freely. Not much seems known of its history. It was introduced to this country by Messrs. Lee, who, we are informed, received it from France, as an unknown Mexican species.

Culture.—We reserve any remarks of our own, to make way for the annexed paper on the subject by one of the most successful cultivators of this interesting race of plants.—M.

THE CULTURE OF DWARF CACTI.

By MAMILLARIA.

THE cultivation of the melon-shaped or globular Cacti has, in this country, been by most people considered a matter of sufficient difficulty to deter them from paying that attention to the merits of the plants which their singularity, and, I may add, beauty, certainly deserves. I propose, therefore, with the view of extending their cultivation, to give some account of their habits and requirements. The tall-growing Cereuses and Epiphyllums are sufficiently understood, and admired for their brilliant flowers, and are honoured with stations at the various flower-shows; but the dwarf Cacti, as they are called, whose merits I now advocate, infinitely more interesting in their habits, and beautiful in the clothing of their surface with variously coloured spines, are neglected and set aside as objects fit only to excite a little passing wonder; whereas, whoever will take the pains to give them the least encouragement, will be amply repaid by the beauty of their appearance when in health, and be gladdened by the rich colouring or delicate white of their blooms through the greater part of the summer. May I add, as a further inducement to their general culture, the growing pleasure that is sure to accompany attention to these elegant and curious exemplifications of Nature's handiworks. I have no fear in asserting that they may be (and are) cultivated as successfully in this country as on the Continent or even in their native Mexico, by attending strictly to a few simple rules; and they will be found not only to require less *skill* than most other plants, but with infinitely less trouble may be preserved in perfection.

The most important points in their culture, as in that of other plants, are the selection of proper soil for them to grow in, and attention to the manner of potting. In lieu of the miserable poverty-stricken lime rubbish and potsherds into which their delicate roots were formerly expected to thrust themselves, a little practice will prove that these plants delight in good treatment and a generous soil, as much as other vegetable productions. This is proved by Nature herself having placed them on the *plains*, and not on *rocks*, as is generally supposed. They are discovered surrounded by a thick layer of leaf mould or other decayed vegetable matter, the richness of which is conveyed to the roots by the rain.* The soil I find most congenial to them is a mixture of two parts *thoroughly decayed* leaf mould, one part good fibry peat, and one part of *sharp* pit sand; to this may be added a *little* free loam.

At least an inch of crocks should be placed at the bottom of each pot, with a piece of the *fibre only* of peat on them to prevent the soil mixing with the crocks. The operation of potting may be commenced in May, about which time healthy plants begin to grow; and may be proceeded with till the middle or end of August, if the weather be sufficiently hot and dry to enable them to make a few roots before winter. After potting, supposing the roots to have been disturbed in changing the soil, they must be placed on a hot dry shelf, fully exposed to the sun, and watered sparingly for a fortnight, or till the roots have taken to the soil. When the roots are quite round the sides of the pots, and the plants in a healthy growing state, they may be watered freely every evening; and when the weather is very hot their health will be improved by freely syringing them with *soft* water every morning. The rule for watering is to commence sparingly in March or April, according to the amount of sunshine, and to increase it gradually as the sun's rays increase in intensity. In September the water must be gradually lessened, and almost entirely withheld by the end of October. After this time a small quantity may be given about once a month if the plants are exposed to the light, as in a greenhouse, but if they are stowed away in a cupboard or chest they will require none. Some of the healthiest individuals I have seen were grown in a window or under a skylight in summer, and stowed away from the end of October till the end of April, in a cupboard with crockery, no other care being taken of them than protecting them from mice, and these animals must be very much pinched to induce them to meddle with them. Although care must be taken that the temperature never falls below the freezing point, it is of importance that they be not excited in the winter months. Artificial heat is not only unnecessary to their growth, but is absolutely injurious, and if a flue or pipes must be employed to keep out the frost, or dry the air of the house, discontinue their use as soon as possible. It would be better to keep out the frost by means of shutters, and to ensure them a dry abode in winter by building them a house *without drip* in a well drained locality. These remarks apply chiefly to the natives of Mexico, which, forming the bulk of most collections, and comprising the greatest variety of species, are most worthy of our consideration.

The propagation of these extraordinary plants is effected either by seeds, cuttings, or offsets, some of which are formed above, some underground—and sometimes by all these means combined. The seed, if ripened early, may be sown as soon as gathered, but if late, should be kept *in the pod* till March. Sow on the same compost as mentioned above, and place the pot near the glass, keeping them always damp. This is the only period of their existence at which bottom heat may be safely applied, but it is not absolutely necessary. When the plants are three months old, prick them off about an inch apart, and do not be in a hurry to pot them singly until they are well squeezed together, as they evidently delight in company when young. Offsets may be removed at any time in the growing season, care being taken that they are of a sufficient size to support themselves till they take root. If, however, you wish some kinds to flower freely, you must remove the offsets as soon as you perceive them, with the point of a knife. This applies to Echinopsis multiplex, and a few others, which, although among the most beautiful and showy species in our collections, are seldom seen to blossom, for want of attending to the removal of offsets as soon as they appear.

Propagation by cuttings, as applied to the stout-growing kinds, requires some skill, and a little knowledge of their nature. As a general rule, do not depend upon a *joint* for roots, as they are produced more freely from a clean cut. Cut only such plants as are in good health; the piece to be removed should be in a growing state. Prepare a place for their reception by placing a pan of perfectly dried sand on a hot dry shelf; expose the wound to the full sun by laying the cutting on its side for a few days. When perfectly dry, stand the cutting on the top of the sand. Inspect it now and then, and if any damp has accumulated dry it again in the sun. As soon as the roots are visible, place the cutting in a single pot, on the surface of the compost recommended above, water sparingly for a fortnight or three weeks, and your plant will be safe. To exemplify this method of cutting, I will mention one instance just now successfully completed. I had a fine Mammillaria Parkinsoniana about six inches high, and three inches broad—worth about four guineas—and seeing no prospect of increasing it either by seeds or offsets, I determined to produce the latter by decapitating it about mid-way—it indeed cut *me* to the quick. This was performed in June, while the plant was growing fast; the top was dried as described, and has rooted, and the old stump is now producing three or four offsets, which will be ready to take off next year. I have had the same success with Pilocereus senilis, and I find it an excellent plan for producing a clean healthy specimen, by practising it upon imported plants with discoloured bases. At some future period I may enter more particularly into the habits of the various genera.

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* It is the accumulation of this which disfigures and discolours the lower part of imported specimens.

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Miscellaneous Notices.

Grave-yards.—We have one suggestion to make, respecting the graveyards now in use in the Metropolis, but which we hope shortly to see altogether discontinued for their present purposes. For what end will they afterwards be applied? We trust that they will not be allowed to remain in their present state, as they will long continue to give forth pestilential exhalations from the masses of corruption contained in them, even should no fresh interments there be permitted. Are they to be built over? This ought on no account to be permitted, as the edifices erected over them must long be subjected to their unwholesome and contagious exhalations, independent of the impropriety of thus violating the sanctuaries of the dead. What course, then, do we recommend to be adopted with regard to them? Our plan is as follows: To cover them over with a thick layer of soil, then to turf and plant them as ornamental garden-ground, with small evergreens and shrubs. Instead of being the means of polluting the atmosphere around them, they will then aid to purify it. They will give a cheerful air to the crowded districts in which they are principally seen; and, to the poor of those parts, who are seldom permitted to reach the green fields and breathe the air of the country, they may afford much enjoyment. The use of vegetation in aiding decomposition, and dispersing the noxious gases which emanate from the corrupting carcasses, is described by credible witnesses. The gardens and greens already formed in some of the squares of the Metropolis contribute essentially to its health, and have appropriately been termed "the lungs of London." If the remedies which we here advocate are adopted, not only will the great and appalling evils which we have pointed out be effectually removed, but some atonement may be made for the ills they have caused by the new sources of comfort, and health, and enjoyment, by which the means for their removal may be accompanied.—*Country Gentleman.*

Cotton Culture in India.—Dr. Cleghorn, at the meeting of the Botanical Society of Edinburgh, on July 11th, directed attention to the culture of Cotton in Mysore. He read extracts from a letter of Captain Onslow, superintendent of Nuggur Division of Mysore, in reference to the culture of American Cotton at Cuddoor. In spite of an unfavourable season the experiment had proved satisfactory. The seeds were supplied from Dr. Wight's government plantation at Coimbatorre. "The natives pay in kind, and the produce is bought, if they like to sell at the market rates." Dr. Cleghorn had given some attention to the momentous question of Indian Cotton culture, when traversing the Peninsula in the execution of duty, and felt no difficulty in expressing his opinion that in the extensive Cotton tracts above the Ghats, large quantities of Cotton might be supplied of an improved quality. In the present state of ignorance and poverty amongst the ryots, it is manifestly unreasonable to expect *rapid* progress in the agriculture of Hindostan. The aiming at new improvements are so many deviations from the practice of their ancestors, whose footsteps they follow with the utmost devotion and reverence—hence progress must be slow, but it is not imperceptible. The face of the country is much improved in the districts longest under our rule, and where good roads exist; the next essential for developing the Cotton trade is the presence of enterprising inland traders. Dr. Cleghorn had examined and compared all the species of *Gossypium* in the Herbarium of the Botanical Society, (comprising the collections of Hamilton, Buchanan, and Lady Dalhousie, with contributions from Wight, Campbell, &c.), and also those in the Herbarium of Professor Balfour, with a view to expiscate the specific characters by which to discriminate them from one another; he considered the entire series remarkable, as showing the striking difference which soil, climate, and culture produce in species, and which may appear in nature, giving rise to a multiplication of species. The whole group of so-called species seems referable to G. herbaceum, L., G. arboreum, L., G. barbadense, L., and G. acuminatum, Rox. The anxiously looked-for work of Dr. Royle, our chief authority, is expected to contain the fullest information on the entire subject of Indian cotton and its culture. The approaching exhibition in 1851 is exciting much interest in India; committees having been formed in the different districts for collecting and forwarding native produce.

Preserving Fruits for Winter Use.—The following remarks which we extract from a clever American work called the "Horticulturist," may not be without interest to some of our fair readers.—"Send to your tinsmith, and get a sufficient number of tin canisters, very carefully and tightly made. They should be of uniform size, and the shape preferred here is seven inches high by five inches in diameter—uniform cylinders. Select the fairest fruit—peaches, strawberries, or what you please. It should be *just* ripe, but not past the mature stage. Fill the canisters, place the tin lids on their tops, and solder them down very carefully. Only a small hole of the size of a pin should be left for the escape of air. The next point is to drive the air out of the canisters of fruit, to prevent its decay. In order to do this, take a broad boiler-pan, (with a flat bottom), place the canisters in it, and fill it with boiling water within about three-fourths of an inch of the tops of the canisters. The boiler being over a *gentle* fire, the water in it should now be made to boil. This will drive the air in each canister through the small hole left in the top, as soon as the temperature approaches 200 degrees; and in order to know precisely when it is all expelled, you must drop a few drops of water upon this hole. When the bubbles of air cease rising through these drops of water, the air is all expelled, and then you may pass a dry cloth over the hole, and let a drop of solder fall upon it. This seals the canister up hermetically, so that the fruit will remain unchanged for a couple of years, or longer. The immersion of the cans in the boiling water does not impart the slightest taste of their having been cooked to the fruit. The canisters of fruit should be left in a cool place. When wanted for use, unsolder the tops with a hot iron, and the fresh fruit is ready—having been perfectly preserved without the aid of sugar or brandy.

New and Rare Plants.

Uropedium Lindenii, *Lindley*. Linden's Uropedium (*Paxt. Fl. Gard.* i., 72).—Nat. Ord., Orchidaceæ § Cypripedeæ.—The most remarkable terrestrial orchid known. It is a stemless herbaceous plant, with thick, fleshy, shining, green leaves a foot long, blunt, and unequally bidentate at the point. The scape is downy, shorter than the leaves, supporting the flowers on separate peduncles six inches long. The sepals are ovate-lanceolate—the two lower ones united, and consequently rather broader—four inches long, white streaked with green; the petals and lip, the latter broadest, linear-lanceolate, shaggy at the base, twenty-one inches long, white streaked with green, the tails having the colour of wine lees. The wild flowers are described as having pale yellow sepals streaked with orange, and purple petals orange at the base. From New Grenada: woods of 8500 feet elevation, overlooking the Lake of Maracaybo. Introduced by M. Linden in 1848. Flowers in May, by M. Pescatore of Paris.

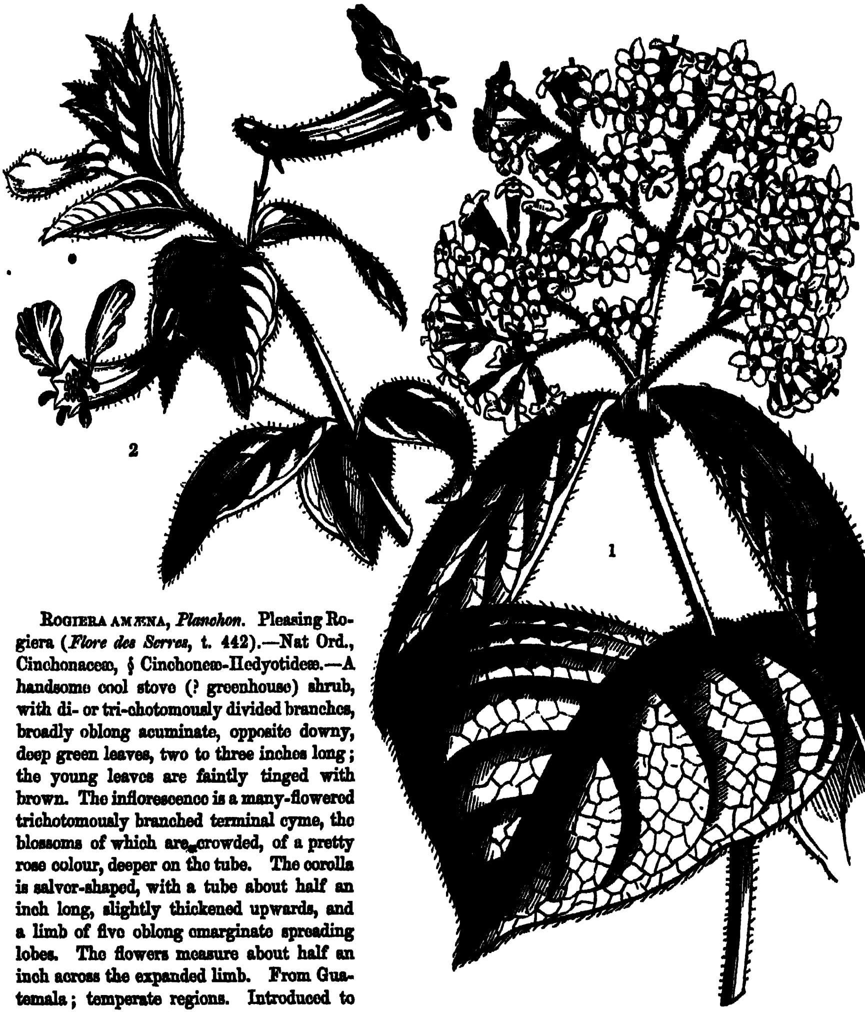
Calamintha mimuloides, *Bentham*. Mimulus-like Calamintha (*Journ. Hort. Soc.*, v. 143).—Nat. Ord., Labiaceæ § Melisseæ.—A pretty, hardy, half-shrubby plant, but too leafy for bedding purposes. It has erect stems, a foot and a half high, regularly and simply branched, and covered with viscid glands. The leaves are ovate, acute, coarsely crenate-serrate. The flowers grow in the axils of the upper leaves, solitary, though each succeeded by five or six others, so that there is a long succession of bloom; they are yellow, deeply stained with orange in the upper part. It forms a deep green summer bush of some beauty. From California. Introduced by Mr. Hartweg, in 1848. Flowers in summer and autumn. Horticultural Society of London.

Gynoxys fragrans, *Hooker*. Fragrant Gynoxis (*Bot. Mag.*, t. 4511).—Nat. Ord., Asteraceæ § Tubulifloreæ Senecioneæ.—A curious tuberous-rooted stove perennial, with long climbing stems, bearing alternate, rather distant, ovate leaves, dark green, and somewhat thick and fleshy. The flowers, which grow in terminal corymbose racemes, are rather large, very fragrant, the scent like that of the Stock; the few narrow ray florets are yellow, the more numerous florets of the disc also yellow, with the syngenesious anthers orange-coloured. From Guatemala. Introduced in 1849. Flowers in winter. Royal Botanic Garden, Kew.

Gaultheria Lindeniana, *Planchon*.—Linden's Gaultheria (*Flore des Serres*, v. 501).—Nat. Ord., Vacciniaceæ.—A pretty greenhouse shrub, with smooth rubescent branches, elliptic evergreen leaves, narrowed to the base, obtuse and apiculate at the apex, crenulate-serrate on the margins, shining green above. The flowers are in racemes, which grow from a few of the upper axils; the calyx and corolla are both pure white, ovate; "the flowers are not remarkable for size, but they are pretty, and rather profuse." From Venezuela: mountains of Caraccas, elevation 6-7000 feet. Introduced to Continental gardens by Mr. Linden, about 1847. Flowers in summer.

Columnea aurantiaca, *Decaisne*. Orange-flowered Columnea.—(*Flore des Serres*, t. 552).—Nat. Ord., Gesneraceæ § Gesnereæ.—A pretty member of a curious race of semi-ligneous, semi-epiphytal, semi-trailing, stove plants. The stems of the present species are suffruticose and succulent, bearing opposite, equal, short-stalked leaves, three to four inches in length, of an oblong-lanceolate, acuminate form; these, as well as the branches, calyces, and exterior surface of the corolla are covered more or less with short adpressed hairs. The flowers are axillary, on peduncles as long as the leaves; the corolla two inches long, the tube ventricose towards the base, the upper lip erect entire, the lower lip patent trifid, all the segments erose-denticulate; the calyx consists of five ovate-acuminate toothed sepals. From New Grenada: Andes of Merida, elevation, between 9,000 and 10,000 feet. Introduced to Continental gardens in? 1843, by Mr. Linden. Flowers? in winter. Requires the treatment of Nematanthi, Alloplecti, and other Columneas.

Echinopsis cristata, var. purpurea, *Hooker*. Purple-crested Echinopsis (*Bot. Mag.* t. 4521).—Nat. Ord., Cactaceæ § Cereidæ.—Syn. Echinocactus obrepandus, *Salm Dyck*.—A fine melon-shaped cactus, requiring the usual greenhouse treatment. The plant is globose, seven inches in diameter, glossy green, deeply furrowed, the projecting ribs, about eighteen in number, nearly straight, and divided into several obtuse-rounded lobes, hence called crested; the spines are large, unequal, and slightly curved. The flowers are very large; from two to four from a plant, arising from near the summit; they are funnel-shaped, with a green tube, six inches long, bearing numerous acuminated scales, and fringed with copious black hair, the scales gradually passing into the numerous purplish rose-coloured sepals and petals, of which the inner are broader and deeper coloured than the outer series; the stamens are yellow, numerous, and inserted at the mouth of the tube. From Bolivia. Introduced in 1846. Flowers in July. Royal Botanic Garden, Kew.



ROGIERA AMŒNA, *Planchon*. Pleasing Rogiera (*Flore des Serres*, t. 442).—Nat Ord., Cinchonaceæ, § Cinchoneæ-Hedyotideæ.—A handsome cool stove (? greenhouse) shrub, with di- or tri-chotomously divided branches, broadly oblong acuminate, opposite downy, deep green leaves, two to three inches long; the young leaves are faintly tinged with brown. The inflorescence is a many-flowered trichotomously branched terminal cyme, the blossoms of which are crowded, of a pretty rose colour, deeper on the tube. The corolla is salver-shaped, with a tube about half an inch long, slightly thickened upwards, and a limb of five oblong emarginate spreading lobes. The flowers measure about half an inch across the expanded limb. From Guatemala; temperate regions. Introduced to Belgium in 1848. Flowers in summer.

1. *Rogiera amœna.*
2. *Cuphea verticillata.*

CUPHEA VERTICILLATA, *Humboldt*, *Bonpland*, and *Kunth*. Whorled-leaved Cuphea (*Flore des Serres*, t. 540).—Nat. Ord., Lythraceæ § Lythreæ.—A pretty half-hardy plant with herbaceous or sub-shrubby hairy stems. The leaves are in whorls of three or four, sometimes opposite, and are nearly sessile, oblong or ovate-oblong, somewhat rounded at the base, scabrous above, hairy beneath. The flowers are extra-axillary, from opposite sides of the stem, and consist of a curved calyx-tube, about an inch long, pale yellowish red, and a very irregular corolla of five to eight deep violet petals, of which the two upper are more than half an inch long, oblong-obovate, and undulated, the rest minute. From Peru and Columbia: found by M. Linden at Pamplona upwards of 8000 feet above the level of the sea. Introduced to continental gardens in 1848. Flowers in autumn.

ISOLOMA BREVIFLORA, *Lindley*. Short-flowered Isoloma (*Bot. Mag.*, t. 4504).—Nat. Ord., Gesneraceæ § Gesnereæ.—Syn.: Isoloma Seemanni, *Decaisne*; Gesnera breviflora, *Lindley*; G. Seemanni, *Hooker*.—A handsome, free-blooming, upright-growing stove herb, with scaly tubers. The stems are two feet or more in height, simple, and villous; with the leaves opposite, or three in a whorl, broadly ovate, or sub-ovate, coarsely serrate, growing on long stalks, the upper ones gradually smaller. The flowers are in crowded whorls, from the axils of the upper leaves, singly on the peduncles; the corolla is very villous, the tube short nearly cylindrical, the limb of five nearly equal rounded segments; they are bright brick-red, inclining to orange, especially at the base, the limb spotted with deeper red. From Panama. Introduced in 1847. Flowers in autumn.

RHODODENDRON JASMINIFLORUM, *Hooker*. Jasmine-flowered Rhododendron (*Bot. Mag.*, t. 4524).—Nat. Ord., Ericaceæ, § Rhododendreæ.—A beautiful small evergreen shrub, requiring probably a warm greenhouse. The branches are bare of leaves below, but towards the upper part these are crowded; they are obovate-oblong, rather acute on short petioles, glabrous, nearly coriaceous. The flowers are numerous in terminal umbels; they are salver-shaped; the tube two inches long, straight, scarcely swollen at the base, the limb of five obovate wavy, spreading, nearly equal lobes; they are white, and have a most beautiful appearance from the coloured eye formed by the cluster of red stamens which appear in the mouth of the tube. From Malacca: Mount Ophir, elevation 5,000 feet. Introduced by Mr. T. Lobb, in 1848. Flowers in September and in May. Messrs. Veitch, of Exeter.

A FEW FACTS CONNECTED WITH WHAT ARE TERMED AMERICAN PLANTS.

By Mr. R. ERRINGTON. C.M.H.S., Gardener to Sir P. M. Egerton, Bart., Oulton Park.

It must be a most gratifying fact to every lover of true progress, to witness in these our days, barrier after barrier thrown down, and with a magical rapidity, too, with which the ignorance and prescriptive conceits of former times had fenced out many objects in horticulture. I do not, however, by any means make the observation as a mere jeer on the by-gone age, which, undoubtedly, fully performed the part allotted to it, as a link in the great chain of time. Nevertheless, ignorance it was; and the high-starched pomposity of time-honoured prescriptions, of course, came in for no mean share in continuing such barriers.

Time was, when the class termed American plants had their culture closely confined to what was termed "bog culture," that is to say, it was considered futile to attempt to cultivate them in any other kind of soil. The idea of examining its component parts, in order to see if such materials as it might be composed of could be brought together, in order to form an economical and efficient representative, had scarcely entered the thoughts of our sires, or if it had done so, merely to be rejected as visionary. Thanks, however, to the progress of science, which has now been brought to influence, more or less, every proceeding of the day, together with an amount of investigation and perseverance unknown in previous ages, such matters have become stripped of the mystery which enshrined them; and, in consequence, many materials within the reach of every one, and which in former days were totally wasted, are now known to be capable of forming an excellent artificial compost for this charming tribe of plants. Hence, we find their culture progressively on the increase, and the time has arrived, when even our ordinary pleasure grounds need not be confined to the dull and sombre Laurel, the Holly, the Yew, &c., but may be made to display, through most of the summer, floral beauties selected from the fast increasing families of the Rhododendron, the Azalea, &c.

Now, it is not merely the gratification of the eye which is the result of this simplification, and, by consequence, extension of such charming objects. No, the mind in looking back, rejoices with a proud satisfaction, in reflecting on the increased assurance of success, which has resulted from bringing true science to bear on horticultural affairs, as also on the fact, that thousands now enjoy such luxuries as were never anticipated in former days, by those in a similar position in society.

I am aware, while offering these remarks, that a book has been written of late on the very subject—a book, by the by, which I have not yet been able to see—and I am aware that some other persons have recently done their best to throw increased light on the subject. Still, as I have been a long and attentive observer as well as admirer of these fine shrubs, together with their habits, I make bold to offer a few hints, and to give a detail of some facts bearing on the subject. Besides, there is nothing like multiplied evidence, until a question is fully established—when matters before of a hypothetical character, frequently become, as it were, mere truisms.

And first, as to a detail of some facts bearing on their culture:—About two years since, in consequence of some alterations in the gardens here, an old rubbish-yard, situated in the suburbs of the kitchen garden, had to be turned over to the ornamental portion of the grounds. Now this yard was full of the remains of rotten vegetables, and indeed, some in an undecomposed state. An elevated mound of American shrubs had to be planted on this site, in order to carry out certain objects; and the higher the mound the better. The first proceeding was to burn or rather char all the raw vegetable matter, and such being done, and the rubbish of the yard generally, thrown into shape and equalized, a coating of coarse-looking clayey matter happening to be the nearest commodity, was spread over the surface, about a foot thick. This clayey material was subsoil, from clayey lands, yet not so adhesive, but that it would crumble with working. Next we applied several loads of leaf mould, and old and spent tan, and finally some fine heath soil, such as had accumulated in Delamere Forest, by the action of heavy rains; of the latter we did not spread more than three inches in thickness. And here, be it observed, that we might have availed ourselves of hundreds of loads of heath or moor soil; but the business had to be hurried, and, moreover, economy of horse labour is no mean consideration in this country, where there is so much demand for team work in other affairs than gardening. The results, however, have shown, that had we incurred ten times the expense, success could not have been more complete; and that the very material necessary for the high culture of American shrubs, with some trifling additions as correctives, existed on the very spot. All these materials then were thoroughly blended together to a considerable depth, much of the raw or undecomposed rubbish, weeds, &c., coming up during the operation; such were of course turned down in the trench.

On this mound was planted a tolerably complete collection of American shrubs, from the families of Rhododendron, Azalea, Kalmia, Ledum, Andromeda, Daphne, Erica, &c., together with such things as the Berberis family, Cotoneaster, Arbutus, Laurustinus, &c. These have flourished even beyond anticipation; indeed, nothing can exceed their robustness; and certainly the growth of the Ericas, (principally in an admixture of the clayey subsoil with the heath soil and leaf mould) exceeds all I have ever witnessed. May not this furnish a hint for the culture of our exotic Ericas?

Now here we have a case in point; no mystery in all this. The materials with their proportions would stand nearly as follows:—Sand, one part; clayey subsoil matter, two parts; decomposed vegetable matter, two parts; undecomposed ditto, as weeds, &c., five parts—admitting, in addition, that a considerable volume of rubbish or raw vegetable matter remained at the bottom of the mound undisturbed; and which the fibres of the coarser kinds would doubtless reach in due time, and here find food in abundance. Surely these things should teach the amateur, or those young in gardening affairs, that vegetable matter ought not to be despised, because it has assumed the name of old tan, or sawdust; and indeed, that as to plants which prefer a soil rich in humus, it matters little what the name, or from whence, providing it has once been a living vegetable itself.

Still some little preparation is necessary, or at least advisable, with such materials as sawdust, weeds, or the stuff of the rubbish-yard; and I must beg to offer a few remarks, which may, perhaps, serve as a beacon to assist the uninitiated in avoiding extremes, tending to disappointment.

The following materials, then, one or other, or perhaps all of them, being within reach of every person, may be made to form an artificial compost adapted to the culture of American shrubs:—Rotten leaves, old and well-spent tan, sawdust, old thatch or litter, weeds, grass mowings, vegetable refuse, the bottoms of old wood-stacks, old manure, &c. Any of these in a highly decomposed state, blended with a certain proportion of loam, or ordinary garden soil, and a liberal amount of any kind of sand, may be rendered fit to cultivate American shrubs. Still, as a mixture of two or three will be better than one alone, I must continue my observations a little farther. It must here be remarked that it is the character of all decomposed vegetable matter, in a highly comminuted state, to enter speedily into the composition of the vegetable fabric, to subside rapidly, or to be washed away by heavy rains. This, therefore, must be guarded against, and it will be found, that undecomposed vegetable fibre in some shape, is the medium to employ, in order to carry out this object. Now such organic matter may consist of tree leaves, of lumps of peat, peaty turf, or moor soil; or indeed any vegetable matter which will be long before total decay takes place; the latter principle, be it understood, is much dependent on the matter being coagulated, or in masses—not totally disintegrated, as in the character of the material itself. Thus far then, as to precautionary measures; I must now take up the subject at the digressive point; and, in doing so, must offer a few comments on the character of each material suggested.

First, *Rotten Leaves.*—Where such materials as old tan or sawdust are liberally used, it would be well to have the leaves in as fresh a state as possible. The best I have found for this purpose, are those which have been used a few months for hotbeds or linings. These generally form into clots or masses, and such need not be too much divided, for they will prove antagonistic to the tendency before alluded to, of washing away, or subsiding. If any manure shall have been mixed with them, they will be none the worse.

Second, *Old Tan.*—I am not aware what effect tan in a fresh state may have on the American tribes, not having tried it; such, however, is not likely to present itself for the purpose, and therefore little need be said. Old tan, however, which has almost become soil, is a very suitable assistant in the compost, and may be used to a considerable extent.

Third, *Sawdust.*—Equally eligible with the former, as, indeed, it well may be, for what are such articles but wood in one stage or other of decay. I have never used sawdust in a perfectly fresh state, but should not for a moment question the propriety of such a proceeding: for Orchids have been successfully grown in it, and their roots are tolerably sensitive. Indeed, as some enduring organic matter should form an item in the compost, it would appear highly eligible to use the sawdust as fresh as possible.

Fourth, *Old Thatch or Litter*.—Here we have an article which will tolerably well represent the surface herbage of peat from the morass, which every one is anxious to possess with the peat. Those who have any quantity of this at hand, may strew it amongst the compost at the final turning, taking care to bury it beneath the surface; here it will slowly decompose, and be of much benefit.

Fifth, *Weeds*, &c.—As American shrubs have no objection to charred materials, as, indeed, is the case with most things in the vegetable kingdom, I would recommend what I practice the year round with such refuse—to burn, or rather char it. In charring our brush-wood prunings, &c., we make a point when the latter is half consumed, of topping, or casing the smouldering heap with all the garden refuse possible, the latter being wheeled to a central spot where the charring is done, for the express purpose. Such then forms an excellent material for almost any garden purpose, and may be liberally worked up as part compost for American shrubs.

As before observed, a very liberal amount of sand should be used; indeed, without this the whole may prove a failure. Any kind of sand will do, and if sand is not to be obtained, an extra quantity of any ordinary soil of a very light and loose character—and of course containing much sand—should be used. No doubt that where it is difficult to procure a sandy material, ordinary soils might be burned for the purpose with good effect,

In order to guide the inexperienced as to proportion in the use of the above materials, I will endeavour to show the relation they should bear to each other in point of quantity, according to my opinion. In doing so, however, I must endeavour to classify them a little, for some persons may possess the whole of the materials there enumerated, and some, perhaps but a few of them. Thus I would say of twenty parts, take of charred material, two; of sandy loam, two; of raw or undecomposed vegetable matter, three; of decomposed vegetable matter, finely divided, five; of sand, eight. Of course the raw or undecomposed vegetable matter would comprise such things as weeds, leaves, straw or litter, hedge dubbings, &c., any or all of them, as the case may be. The decomposed vegetable matter would consist of the old tan, old manure, old leaves, old sawdust, and any old boggy, moor, or heath soil, which could be spared for the purpose; any two or more of these well blended with the mass. As for the inorganic materials, which hold as it were an almost negative position, —their mode of action being for the most part of a mechanical character—debris of any kind, whenever at hand, may help to constitute the mass, and to take the place of sand.

Before concluding these remarks, there is one important point I would advert to as connected with the culture of American shrubs; and that is the necessity of securing a permanency of moisture in the soil. This is indeed so important, that it matters little how the compost is constituted, if this essential point be neglected. It is, we know, a very common practice to plant them on mounds, slopes, or embankments, at once the best situation for effect, and the worst for their culture. If their health alone were to be studied, sunken panels would in all probability be more suitable in the majority of situations; and I think that such might frequently be introduced in the ordinary pleasure ground, with a very good effect. Be that as it may, if they are planted on elevated beds over a thirsty subsoil, I would advise what has often been practised with great success, viz., the use of sphagnum, or other mosses, as top dressings, laying such on about four inches thick every spring—say, in the end of April, after a rainy period.

As part of the general embellishment of ornamental grounds, these beautiful shrubs are doubtless superior to all others; indeed, what place would be considered satisfactory without them? When we consider the highly dressy character of most of them, their splendid, and sometimes gorgeous hues, their quaint and delicate pencillings, and the delightful fragrance of many of them, it must be confessed that no pains should be thought too great to obtain, and highly cultivate an extensive collection. Those who had the good fortune to see the display at the Regent's Park Botanic Garden, last June, will not readily forget them, and the impulse given to their more extended culture, through such a noble display, must be immense. The chance they offer to the hybridiser, too, must not be lost sight of, and we may judge of what they will become in future, by the immense progress already made, a progress to which it is difficult to assign a limitation. Another great feature remains to be added—the eligibility, I mean, of a very great many of them for what is termed forcing. Take away these and the lovely Hyacinth from the forcing gardener, and a most lamentable void would be created, although we are now so rich in materials for this purpose. And when about to be subjected to the forcing process, where is the tribe that will so well submit to be transferred from the border or reserve ground, and return to it again with so little injury or difficulty?

SEEDLING PICOTEES.

Nat. Order, CARYOPHYLLACEÆ.

GENERIC CHARACTER.—Dianthus, *Linnæus*. *Calyx* tubular, monophyllous, cylindrical, five-toothed, with two or more opposite imbricated scales at the base. *Petals* with narrow angular claws as long as the calyx; limb flat, dilated outwards. *Stamens* ten, with awl-shaped filaments, and oval-oblong, compressed, incumbent anthers. *Styles* two, longer than the stamens, with recurved downy stigmas. *Capsules* cylindrical, one-celled, opening at top by four valves, many seeded. *Seeds* peltate, convex above, concave beneath. *Embryo* scarcely curved.

DIANTHUS CARYOPHYLLUS, *Linnæus*.—Stem branched; leaves linear-awl-shaped, with smooth margins, channelled, glaucous; flowers solitary; involucral scales four, very short, broadly ovate, somewhat mucronate; petals broad, beardless.

Var. flore-pleno.—Flowers double. This state includes the florists sections, *Carnation* and *Picotee*, the former having the petals striped, the latter margined, with colour distinct from the ground colour.

PICOTEES—1. *Dodwell's Alfred*.
2. *Hollyoake's Duke of Rutland*.
3. *Norman's Mrs. Norman*.

DESCRIPTION.—The Picotees here figured may be classed among the very best of the season, and very superior to anything out in their respective classes. Alfred, heavy purple edged, is an exquisitely beautiful thing, the white being particularly clear and clean, and the edge of colour even, and well laid on. From the number of flowers exhibited during the season, it appears to be a very constant variety. It was raised by Mr. Dodwell, an enthusiastic and very successful amateur cultivator residing at Derby, and bloomed for the first time in 1849, its parent being Wood's Princess Alice; it was obligingly communicated to us, along with the Duke of Rutland, noticed below, by Mr. Turner, of the Royal Nursery, Slough. Mrs. Norman, heavy red-edged, was raised by Mr. N. Norman, a well-known cultivator of Woolwich, and was originated from seed saved from "Headley's King James," fertilized with the pollen of "Ely's Emperor," both heavy red-edged flowers; as was also "King James II.," another fine variety sent to us by Mr. Norman. Mr. Turner, and we need no better authority, writing of these flowers, observes, "Alfred and Mrs. Norman are the two best flowers of the day." Mrs. Norman is a constant and very superb variety; indeed, as a test of its quality, we may relate an anecdote told us some years back by Mr. Rivers, which used to guide him in some measure in purchasing French Roses. When a flower is named after a nurseryman's wife, you may depend that it is a good flower, for this reason! "If she is a good wife he would not name a bad flower after her, and if she is a termagant, she will take good care that a bad flower does not bear her name." Judging our Picotee by this test, there can be no doubt it is a first-rate variety. We believe the stock of this flower has been disposed of by subscription, and will be sent out in October. Duke of Rutland, heavy purple, is a beautiful flower, raised by Mr. Hollyoake, of Leicester, and bloomed for the first time in 1848.

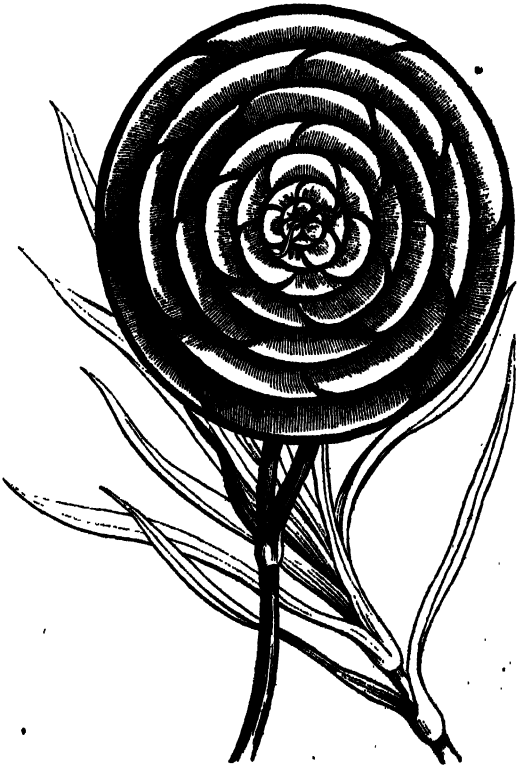


DIAGRAM OF A PERFECT PICOTEE.

Like Alfred, it is a free grower, and constant, but quite of a different shade of colour. Ho far our colourers may succeed in giving the exact tint, we cannot at present tell; so slight marking it is very difficult to get sufficiently dense in its outline.

Culture.—The following hints on the potting of Carnations and Picotees are obligingl communicated by a well-known amateur at Woolwich, and indicate the practice of the bes growers in that neighbourhood:—

"The layers of Carnations and Picotees should be taken off as soon as they begin to fibre, an either potted or planted in a nursery bed until October, in either case shutting them close in frame until they have got hold. If they are potted, it may be necessary, should they fill the firs pots with roots, to repot in October; the practice will, however, be found to repay the extr trouble. Prune them to a clean stem, so that the lower pair of leaves may stand at least half a inch above the surface, taking out all laterals of an inch long and over, many of which wil from this time to the beginning of October, strike; and though some will bloom, the majorit will make those much coveted plants, which, not having strength to bloom next season, wil form extraordinary fine and sound stock for the succeeding year, such as we term maide plants. These laterals, if left on the plant, do it no good, and, if buried at all, are of infinit damage to it by engendering canker. They are, moreover, usually removed and rejecte at the spring potting, as likely to spindle for bloom, and so distress the leading blooms It is, therefore, surely best to take them off now, when they may be made stock of, rathe than leave them on to the injury of the parent, and to waste them in the spring.

"This pruning must not be done carelessly by tearing off the leaves, which wounds th stem and causes decay, but by cutting nearly through the midrib at each of the joints, and s detaching them by a gentle twist to the right and left.

"This plan has been found by the growers here to tend greatly to the soundness of th stock; and when it is considered that it is no more than an imitation of the natural growth o the seedling plants, which (as well as plants raised from pipings or cuttings) always form a clean stem, it is but rational to suppose that such a form of plant must be best.

"As to the compost used for the winter potting, it is usually recommended to be pur loam, which, no doubt, will answer well for naturally grown plants (such as we usuall receive from the northern growers); but for plants the parents of which have been excite by every available means to excessive growth, I question the correctness of so sudden change; at all events, we have used with success a mixture of the compost in which w bloomed our plants the preceding year (which will consequently have had the benefit of winter's frost and a summer's sun), with a good portion of turfy loam, avoiding by all mean the use of a sieve; simply well breaking and mixing it with a spade.

"In detaching the layers, cut off the stem of the layer to the corresponding half of th joint which is rooted, and that will, before autumn, also root, thus forming a plant almos equal in soundness to one raised from a cutting."—N.

THE PROPERTIES OF THE PICOTEE.

The Properties of form are similar to those of the Carnation, to be given hereafter; but the distinction between Carnations and Picotees is, that the colour of the former is disposed in unequal stripes going from the centre to the outer edges, and that of the Picotees is disposed on the outer edges of th petals, and radiates inwards, and the more uniform this is disposed the better.

Whether it be very deeply feathered at the edge, like the pattern on the edge of a heavy feathere Tulip, or an even stripe not wider than the thickness of the petal, all round the edge, or somethin between, it is only necessary that it be uniform; that none of the feathery marks have a break, an that there shall be as much width of white as colour seen on the petal at the deepest part of the feather. It is not necessary that the feather be the same width all the way round, but every stripe which doe not reach the edge of the petal is a blemish.

DISQUALIFICATIONS OF BLOOMS.

1. If there be any petal dead or mutilated.
2. If there be any one petal in which there is no colour.

3. If there be any one petal in which there is no white.
4. If a pod be split down to the sub-calyx. If a guard petal be badly split.
5. Notched edges are glaring faults, for which no excellence in other respects compensates.*

GREENHOUSE AND OTHER ANNUALS FOR AUTUMN SOWING.

PERMIT me, through the medium of your interesting periodical, to call the attention of your amateur readers to the extreme usefulness of certain annuals, when sown at this season, for decorating the conservatory and flower-garden in the spring and early summer. I recollect some years back, seeing in the garden of G. W. Norman, Esq., at Bromley, under the care of that most assiduous cultivator, Mr. W. Barnes, some specimens of that little simple, though lovely thing, Rhodanthe Manglesii in eleven or thirteen-inch pots, and which could not have been less than two feet in height, and as much in diameter, and, at the same time, Mignonette bushes nearly as large. At Chatsworth, some sixteen or eighteen years back, I once saw magnificent bushes of Schizanthus Hookerii; and the splendid plants of Clintonia pulchella, which used to be exhibited at Chiswick when it was first introduced, must be familiar to many of our best gardeners. But where are they now? For years past we have not seen them; and yet how easy it would be to grow them, and how interesting they would be! Phlox Drummondii, not many years back, graced the principal collections of plants at the Metropolitan exhibitions early in the season, and some of the finer varieties, when properly grown, make most admirable plants for conservatory decoration. "Oh, but," remarks some one not yet versed in the art and mystery of growing annuals to perfection, "I have tried them, and they will not do." Why? simply because you began at the wrong time; instead of sowing them at Michaelmas, you committed them to the fostering care of your Cucumber-frame in March, and after nursing them for a few weeks, they started prematurely into bloom, became useless, and were thrown away.

Now let me beg of all such as imagine that annuals cannot be turned to good account, to procure the following, and sow them as early in the month of September as possible, viz., Phlox Drummondii oculata, oculata alba, and Leopoldiana; Rhodanthe Manglesii, Clintonia pulchella, Schizanthus Hookerii, and retusus albus, Lobelia ramosa, Portulaca Thellusonii, splendens, and Thorburnii, and Grammanthes gentianoides. These must be sown in rich light soil, and be placed in a warm frame until they begin to vegetate; then inure them to full exposure, and so soon as they are large enough, prick them singly into small pots, or some of the smaller kinds, as the Clintonia, Lobelia, and Grammanthes, may be placed three or four in a pot. Use a light and tolerably rich compost, but avoid anything too stimulating; place the plants in a close frame or pit until they are thoroughly established, and then remove them to a nice airy shelf in a warm part of the greenhouse. As the plants progress in growth, stop them occasionally, to induce a diffuse and spreading habit, and shift into larger pots as the plants require it, regardless of the time of the year, and everything else, except that of keeping the plants steadily growing. Should the Rhodanthe or Phloxes show flower, pinch it off immediately, and continue to pinch it off until the plants are thoroughly established in eight-inch pots, this will be by the end of February, and then they may receive their final shift into eleven-inch pots. Through the winter the plants will not require much water, but take care they do not suffer for the want of it. The following will be found an excellent compost:—turfy loam, two parts; peat, one part; and the same of leaf mould; the whole liberally intermixed with gritty sand and charcoal. The Phlox may be found subject to mildew, which must be destroyed by the usual application of sulphur dusted over the parts affected. The temperature of the greenhouse will be found quite sufficient, but avoid cold draughts near the plants. Plants thus treated will be a blaze through April and May, and will impart quite a new feature to the conservatory. In passing, it may be remarked, the Schizanthus retusus albus is one of the finest annuals in cultivation, and most admirably adapted for sowing at the present time. Mignonette, to grow it into large bushes, only requires rich soil, a suitable temperature, such as that of an airy greenhouse, and the abstraction of the flowers until the plants are thoroughly established.

Now, of annuals for the flower-garden, it may be stated that all those from California, or the Rocky Mountains, are hardy in this country; such as Clarkias, Collinsias, Godetias, Gilias, Iberis, Nemophila, and many more, but the members of these six families alone would make a grand display, assisted by single and double Wallflowers, Erysimums, and the usual spring flowers; indeed, with them a garden with its baskets and vases may be kept very gay in the early part of the season. These annuals must be sown on light, sandy, and rather poor soil, in a situation not fully exposed to the mid-day sun, but where there is a free circulation of air, and where, at the same time, they are not likely to suffer from stagnant moisture about their stems. Should the winter prove very severe, a few evergreen branches may be thrown over the plants for protection, for they suffer more from the sun acting on their frozen tissue, than from excessive cold. Transplant to the beds either in November or January, if the weather is suitable; but after the middle of February, they will not succeed if transplanted, as the dry winds of March will be sure to parch them up before they are established. These annuals we sometimes plant in entire beds, but more frequently around the margins, leaving the centre filled with bulbs, which, being taken up in May, give room for the summer occupants to be planted without disturbing the annuals, which will continue to bloom until the summer plants require the room.—H. P. Y.

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* Glenny's Properties of Flowers.

A DESIGN FOR A ROSE GARDEN, AND A PLEA FOR ROSES.

THE accompanying plan and sketches for a Rosery, designed by Mr. Herman Seitz (of Munich), now residing at Chatsworth, are submitted to the readers of the *Gardeners' Magazine of Botany*, as suitable arrangements for displaying a goodly variety of the numerous beautiful Climbing, Pillar, Dwarf, and Standard Roses, which, through the assiduity and discrimination of our great Rose culturists, are now worthy of introduction to—aye, and are deserving a more distinguished position in—the flower garden scenes of England.

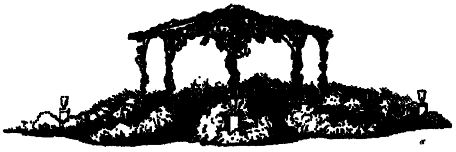
TRELLIAGE ACCOMPANIMENT: No. 1.

Previous to adverting to details, however, it may not be considered out of place to direct an observation or two in reference to the present position of "La Reine des fleurs" in the majority of our gardens.

It will not be controverted—albeit, the numberless "beauties of the Rose," Messrs. Rivers, Lane, Paul, Francis, Wood, &c., have brought to our garden gates, as it were—that the Queen of flowers, is too generally permitted, or rather compelled, to occupy a situation inferior to her regal rank, and the very reverse of dignified; nor will it be gainsayed that there exists scarcely a garden of any pretensions, where the introduction of Roses, *en masse*, might not advantageously be effected.

It is quite true, however, that occasional very laudable exceptions to the state of things just alluded to, might be enumerated. For example, there is, or was, at Nuneham, Oxfordshire, a Rosarium reflecting no small credit on its artist; and the same might be said of an unique little Rose-garden which I remember to have seen, some few years ago, at Flitwich, Bedfordshire; and, doubtless, of other gardens also, in various parts of the country, which it may not have been my good fortune to see.

Still, after having, from time to time, visited some of the principal gardens in Britain, and learnt somewhat of places that have not come under my own immediate observation, I would I could, but regret I cannot, adduce a single instance where, in my humble estimation, the Rose receives due homage! On the contrary, I cannot refrain from asserting my conviction and surprise, that, with a very limited number of exceptions, the glorious tribes of the Rose experience manifest indignities throughout the entire range of our flower-gardens; and, moreover, that in the grandest places, as well as in more circumscribed garden scenes, there is apparent a marvellous absence of concentrated Rose gardens.



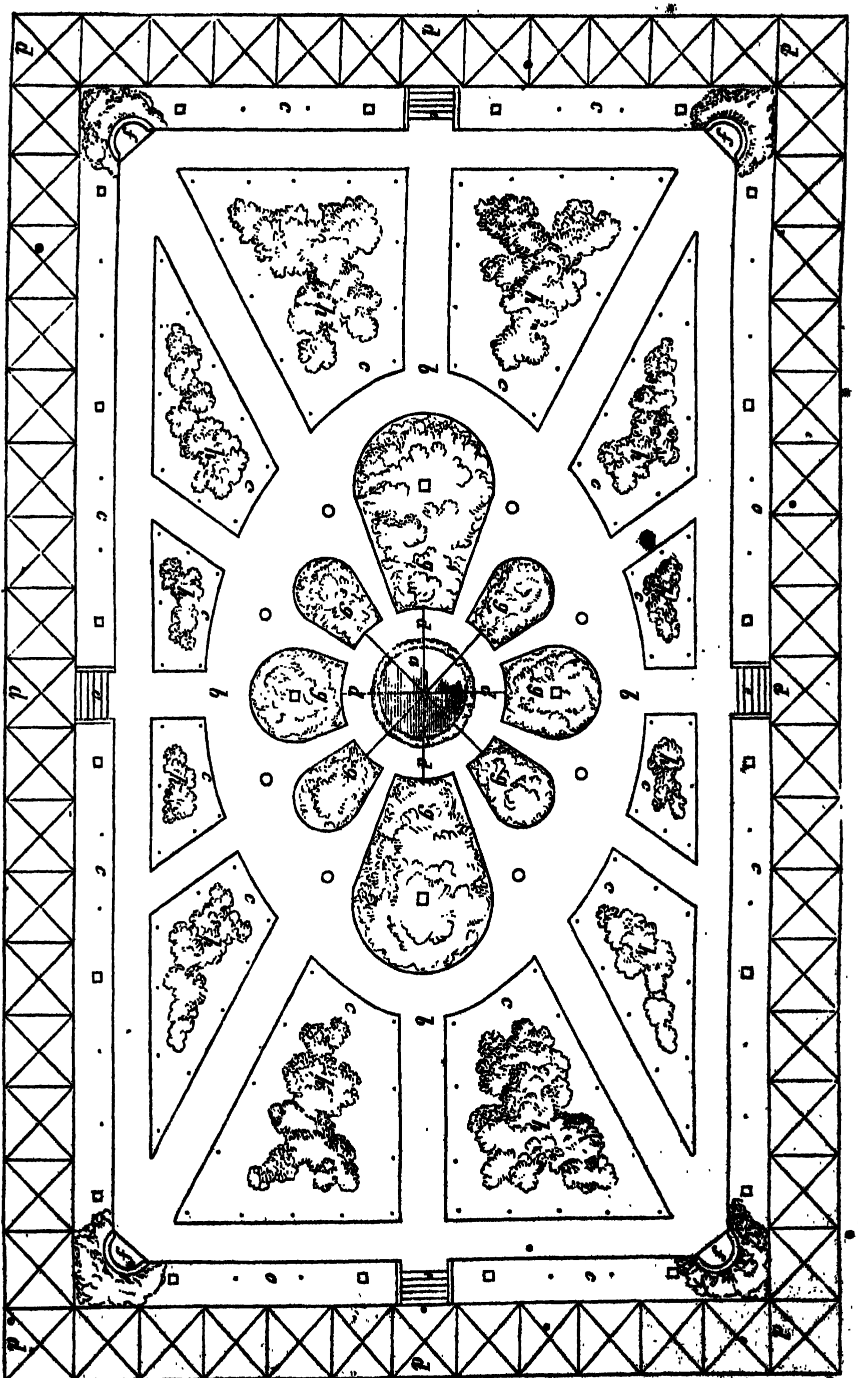
TRELLIAGE ACCOMPANIMENT: No. 2.

The design for a Rosery now presented, neither assumes a remedy for all this, nor presumes perfection in displaying Roses to advantage upon our lawns and shrubberies—far from it; but it is premised the plan may not be deemed otherwise than a step in the right direction, and, if so, worthy of insertion in this periodical.

It should be observed, however, that the adoption of such a plan would not be practicable unless upon a somewhat extensive scale—a parallelogram of 150 feet by 100 feet, for example, being the least

REFERENCE TO PLAN, PAGE 93:—

a.—Pond of water margined with dwarf, and embowered with climbing Roses.
b.—Gravel walks.
c.—Grass.
d.—Colonnade festooned and embowered with climbing Roses.
e.—Flights of steps supported with vases.
f.—Raised seats embowered with Roses and supported with vases.
g.—Parterre on gravel arranged with masses of Tea-scented and Chinese Roses.
h.—Irregular combinations of various "Summer and Autumnal" Roses.
□.—Vases filled with dwarf Roses.
o.—Standard Roses of different heights.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space it should be attempted upon; whilst, on the other hand, the design could, of course, be executed upon the most extensive scale that local circumstances admitted of.

The situation of such a *parterre*, far from being obtrusive, it is intended should be somewhat secluded. Perhaps an appropriate site would best be obtained by clearing, well sub-draining, and reducing to an even surface, a suitable portion of some extensive shrubbery scene, contiguous to some main walk or walks, whence the principal approach to it might be obtained, and not far remote from the mansion. The proximity of lofty timber or ornamental trees would, for obvious reasons, be objectionable; whereas the presence of a grown up shrubbery, of American plants and common evergreens, would confer the requisite degree of seclusion, exhibit a suitable back-ground mass, and afford considerable shelter—the latter being an especial desideratum in the culture of some of the most beautiful tender sorts of Roses; whilst hardier kinds would also derive much benefit by being less exposed to the sweeping blasts we not unfrequently experience in spring and early summer.

It is presumed that a judicious blending of grass and gravel, conjoined with the addition of a central basin of translucent water, containing gold fish and a few choice aquatics, and having a fountain, vase, or statue placed in the centre—the entire basin, with its concentric walk, being embowered with Climbing Roses—the entire garden, being surrounded with a light skeleton colonnade, also covered and festooned with Climbing Roses, would produce a varied and highly pleasing effect in a garden of the kind.

The sketches 1 and 2, exhibit the trelliage accompaniments to the Rosarium; and it will be obvious they present admirable sites for displaying Climbing Roses in great variety. Rod iron would, of course, be the most appropriate material to employ in their erection, although wood is sometimes used. These trelliage accompaniments should not be less than nine or ten feet high, nor should the width of the outer colonnade be less than seven or eight feet.

The walk beneath may either be made of gravel, paved with wood or stone, or formed of asphalte, according to taste; doubtless gravel would present the best appearance, provided that of a good quality be obtainable in the locality.

In the sketch No. 1, it will be perceived that a frontage with open columns has been given to the colonnade on the inner or garden side in order that the promenader, beneath a canopy of Climbing Roses, may be enabled to look down upon the Rosery beneath, arranged with standard and dwarf masses. Were the shrubbery in the background arranged with American plants and other choice evergreens for ornamental effect, there would be an obvious advantage attending the forming of both sides of the colonnade alike; but, if the reverse of such an arrangement be adopted—the background merely consisting of a thicket of common shrubs, &c.—the better plan would evidently be to close in the outer side of the promenade with a thick hedge of Laurel, Ivy, Box, Laurustinus, Holly, or Yew, amongst which Bengal and common China Roses might be introduced for enlivening the scene.

On the inner or garden side of the rose-covered boundary walk, Climbing sorts, suitable for producing what are termed "Pillar Roses," might be introduced in conjunction with Standards, and a vase or two for breaking the monotony of the long line of trelliage, &c. The sorts suitable for Pillar Roses would be best disposed by planting them against the main supports or columns of the trellis-work, training a portion of their growth over the roof of the latter, whilst the remainder of their long flexible shoots would depend, and by a little management and attention form projecting "pillars" of luxuriant beauty.

Steps are shown in the plan conducting from the garden to the trellised colonnade surrounding the former, and which it is intended should be elevated some three or four feet above the general level, and upon which, in the respective angles of the parallelogram, raised seats canopied with Climbing Roses are also indicated.

Situations for Standard Roses, varying in height from two to six or more feet, and vases, are described on the plan by minute circles and dotted lines for the former, and by small squares for the latter. Miniature, Provence, or Pompon, with Dwarf, Chinese, or "Fairy" Roses, would be the most suitable kinds for planting vases with; and if the bases or pedestals of the latter were planted with choice climbing kinds, the partial interspersion of these through the garden would doubtless be productive of the most unique result; and the same miniature tribes might appropriately be further employed in furnishing the small circles formed at the base of Standards, as well as for describing compact zones of Dwarf Roses to the margins of the larger and more varied groups on grass; for, in connection with grass, these attractive little Roses always look exceedingly well.

Finally, as regards the sorts best adapted for producing rich irregular masses on the grass portion of our plan. The selection and arrangement, in this instance also, must obviously be dependent on the taste of the proprietor; suffice it to premise here, that among the numberless varieties of what are termed "summer and autumnal" Roses, there need be no standing still for want of subjects. Doubtless, however, an arrangement for blending together a goodly number of the best sorts selected from each class of these principal divisions, if made judiciously and carried out tastefully in the grouping and disposition of them, would be the most pleasing, if not appropriate one that could be adopted. Similar observations to the foregoing must also apply to the choice and disposition of Climbing, Standard, and Pillar Roses, indispensable to the creation and adornment of such a Rosery as the preceding remarks have attempted to describe.

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CARNATIONS AND PICOTEES.—NORTHERN v. SOUTHERN VARIETIES.

UNDER this heading two grand exhibitions have been held during the last few weeks, one for the southern division, at the Royal Nursery, Slough, on July 25th; and that for the northern district at Derby on August 7th. These exhibitions originated with Mr. Edwards, of Wace Cottage, Holloway, in a desire to settle the long standing differences between the northern and southern growers, as to the quality of their various productions; the former accusing their opponents of showing large moppy flowers, while the latter assert that the flowers as shown by the northern growers, are scarcely removed from single blessedness, being so severely dressed as, in some cases, not to leave more than two tiers of petals—therefore, the northern growers *dress* to what they consider perfection, while the southern growers wish *to grow* the flowers to as near an approximation as possible of their standard. For the information of those who are not versed in floricultural technicalities, it may be necessary to observe that Carnations and Picotees, and also Pinks, when shown as cut flowers are dressed; that is, all run or deformed petals are removed, and those retained are placed so as to imbricate and present a uniform appearance. Now there can be no question that if it were possible to get flowers to such a state of perfection as they would not require any dressing, it would be a move in the right direction; and, on the same principle it must be equally evident that a flower which presents the greatest quantity of properly marked and uniform petals, must be the best. Hence the southern standard of perfection is the best, and enjoins a higher finish, as it were, to the flowers than the standard of the northern growers. Judging, however, of the dressing of the flowers as we saw them at Slough, we should be inclined to say with a son of the Green Isle, that so far as dressing was concerned, the north and south country flowers, if "there was any difference, were both alike;" for, judging them by that test, it would have required a very sharp eye to have detected any dissimilarity. Leaving, however, the matter in dispute to those interested, we will proceed to detailed reports of the two meetings, which, we doubt not, will be interesting to the growers of these magnificent flowers.

AWARD OF PRIZES AT SLOUGH.

NORTHERN RAISED CARNATIONS—SIX BLOOMS.

First, *Mr. Turner, Slough*, for Admiral Curzon, Princess (Taylor), Premier (Millwood), Cradley Pet, Splendour, and Lord Milton. Second, *Mr. Barringer, Bedford*, for Paul Pry, King of Scarlets, Admiral Curzon, Lord Milton, Premier, and Lovely Ann. Third, *Mr. Dodwell, Derby*, for Premier, Admiral Curzon, Seedling, Beauty of Woodhouse, Squire Trow, and Pyracanthus. Fourth, *Mr. Bragg, Slough*, for Defiance, Squire Trow, Henry Kirke White, Paul Pry, King of Scarlets, and Beauty of Woodhouse. Fifth, *Mr. Willmer, Sunbury*, for King of Scarlets, Victory, True Briton, Squire Meynell, Rainbow, and Queen of England.

SOUTHERN CARNATIONS.

First, *Mr. Turner*, for Duncan (May), Justice Shallow (May), Princess Royal (Puxley), Howard (Puxley), Owen Glendower (May), and Lorenzo (May). Second, *Mr. Bragg*, for Flora's Garland, Hero of Middlesex, Prince Albert, Prince Arthur, Sarah Payne, and Conquering Hero. Third, *Mr. Keynes, Salisbury*, for Prince Albert (Hale), Sarah Payne, Flora's Garland, Prince of Wales (Puxley), Lord Rancliffe, and Prince Albert (Puxley). Fourth, *Morgan May, Esq., Sonning*, for Timon (May), Percy (May), Falconbridge (May), Bardolph (May), Bolinbroke (May), and Prince Albert (Puxley). Fifth, *Mr. Edwards, Holloway*, for Sarah Payne, Harriet, Prince Albert (Hale), Julia, Flora's Garland, and Lydia.

SOUTHERN PICOTEES.

First, *Mr. Turner*, for Princess Royal (Willmer), Gem (Youell), Ophelia (May), Mrs. Barnard (Barnard), Queen Victoria (Green), and Cressida (May). Second, *Mr. Lochner, Paddington*, for Princess Royal, Lady Harriet Moore (Turner), Lorina, Queen Victoria (Green), Mrs. Barnard, and Amy. Third, *Mr. May*, for Cleopatra, Juliet, Ophelia, Viola, Princess Royal, and Beatrice. Fourth, *Mr. Bragg*, for Gem, Venus, Princess Royal, Portia, Lady Alice Peel, and Jenny Lind. Fifth, *Mr. Keynes*, for Lady Harriet Moore, Isabella (Wildman), Juliet (May), Princess Royal (Willmer), Useful (Sealy), and Mrs. Barnard.

NORTHERN PICOTEES.

First, *Mr. Dodwell*, for Mary (Dodwell), Miss Rosa (Merryweather), Prince of Wales (Marris), Alfred (Dodwell), Prince Albert (Marris), and Seedling 26 (Dodwell). Second, *Mr. Turner*, for Prince Albert (Marris), Unexpected (Marris), Prince of Wales (Marris), Duke of Rutland (Hollyoake), Alfred (Dodwell), and Mary (Dodwell). Third, *Mr. Keynes*, for Proconsul, Emma, Prince Albert, Lady Sale, Lord John Russell, and Privateer. Fourth, *Mr. Willmer*, for Mr. Green, Prince of Wales, Field Marshal, Fair Ellen, Emperor, and Emily.

The premier prizes between the first stands of northern and southern flowers, were awarded to Mr. Turner, both in Carnations and Picotees.

CLASS SHOWING.

CARNATIONS—SCARLET BIZARRES.

First, *Mr. Turner*, for Emperor (Puxley). Second, *Mr. Turner*, for Admiral Curzon. Third, *Mr. Keynes*, for Prince Albert (Hale). Fourth, *Mr. Turner*, for Bardolph (May).

CRIMSON BIZARRES.

First, *Mr. Turner*, for Lord Milton. Second and Third, *Mr. Young, Twyford*, for Seedling. Fourth, *Mr. Turner*, for Lord Milton.

PINK BIZARRES.

First, *Mr. Turner*, for Henry Kirke White (Taylor). Second, *Mr. May*, for Falconbridge (May). Third, *Mr. Turner*, for Falconbridge (May). Fourth, *Mr. Keynes*, for Twyford Perfection.

SCARLET FLAKES.

First, *Mr. Turner*, for Justice Shallow (May). Second, *Mr. Keynes*, for William IV. Third, *Mr. Turner*, for Justice Shallow (May). Fourth, *Mr. Edwards*, for Lydia.

PURPLE FLAKES.

First, *Mr. Adams*, for Premier (Millwood). Second, *Mr. Turner*, for Perfection (Puxley). Third, *Mr. Turner*, for Great Northern (Ely). Fourth, *Mr. Adams*, for Lord Byron.

PINK FLAKES.

First, *Mr. Willmer*, for Flora's Garland. Second, *Mr. Adams*, for Prince Arthur. Third, *Mr. Willmer*, for Rosetta. Fourth, *Mr. Turner*, for Ariel (May).

PICOTEES—LIGHT-RED EDGE.

First and Second, *Mr. Dodwell*, for Mary (Dodwell). Third, *Rev. A. Matthews*, for Cassandra. Fourth, *Mr. Turner*, for Gem (Youell).

LIGHT-PURPLE.

First, *Mr. Turner*, for Prince Albert. Second, *Mr. Bragg*, for Juliet. Third, *Rev. A. Matthews*, for Purity. Fourth, *Rev. A. Matthews*, for Circe.

HEAVY-PURPLE.

First, *Mr. Turner*, for Alfred (Dodwell). Second, *Mr. Turner*, for Viola (May). Third, *Mr. Turner*, for Seedling (May). Fourth, *Mr. May*, for Viola.

LIGHT-ROSE.

First, second, and third, *Mr. Turner*, for Mrs. Barnard. Fourth, *Mr. Turner*, for Countess Howe (Hollyoake).

HEAVY RED EDGE.

First, *Mr. Adams*, for Prince of Wales (Marris). Second and third, *Mr. Dodwell*, for Prince of Wales (Marris). Fourth, *Mr. Turner*, for King James (Headley).

HEAVY-ROSE.

First, *Mr. Turner*, for Queen Victoria (Green). Second and third, *Mr. Turner*, for Venus (Headley). Fourth, *Mr. Turner*, for Unexpected (Marris).

AWARD OF PRIZES AT DERBY.

NORTHERN CARNATIONS—IN SIXES.

First, *Mr. Dodwell*, for Princess, Admiral Curzon, Seedling 31, Seedling 47, Seedling 32, and Premier. Second, *Mr. Haines*, for Black Diamond (Haines), Hamlet, Lady Ely, Squire Meynell, William IV. (Wilson), Lord Lewisham. Third, *Mr. Turner*, for Miss Rushin, Lord Lewisham, Seedling (Hollyoake), Admiral Curzon, Seedling (Marris), Lord Byron. Fourth, *Mr. Bunwell*, for Lord Byron, Admiral Curzon, Ocean Queen, King of Scarlets, Bellerophon, Lord Milton. Fifth, *Mr. Bayley*, for Seedling (Dodwell), Lord Milton, True Briton, Admiral Curzon, Squire Meynell, and Seedling (Dodwell).

SOUTHERN CARNATIONS.

First, *Mr. Turner*, for Flora's Garland, Emperor (Puxley), Poins (May), Jenny Lind (Puxley), Tybalt (May), Ariel (May). Second, *Mr. Haines*, for Hotspur (May), Flora's Garland, Apollo, Ariel, Excellent, Venus (Willmer). Third, *Mr. Dodwell*, for Firebrand, President, Apollo, Lord Rancliffe, Ariel, Prince Albert. Fourth, *Mr. Edwards*, for Queen, Mary Ann, Ariel, Lord Rancliffe, Hero of Middlesex, Flora's Garland. Fifth, *Mr. Bragg*, for Ariel, Flora's Garland, Prince Albert, Sarah Payne, Prince de Nassau, Princess Royal.

NORTHERN PICOTEES.

First, *Mr. Turner*, for Victoria Regina (Marris), Alfred (Dodwell), Countess Howe (Marris), Duke of Rutland (Hollyoake), Grace Darling (Marris), Alice (Dodwell). Second, *Mr. Dodwell*, for Alfred (Dodwell), Princess Royal (Marris), Prince of Wales (Marris), Fanny (Dodwell), Miss Rosa (Merrywether), Duke of Rutland (Hollyoake). Third, *Mr. Bayley*, for Seedling (Dodwell), Prince of Wales, Seedling (Dodwell), Iphigene (Marris), Seedling (Dodwell). Fourth, *Mr Haines*, for Prince of Wales, Prince Albert (Marris), Miss Rosa, Seedling (Hudson), Seedling (Haines), Proconsul. Fifth, *Mr. Merrywether*, for Miss Rosa, Mrs. Wood (Merrywether), Lady Franklin (Merrywether), Lady Sale (Ely), Seedling 35.

SOUTHERN PICOTEES.

First, *Mr. Turner*, for Mrs. Barnard, Juliet (May), Cleopatra (May), Green's Queen, Viola (May), Lorina (Burroughes). Second, *Mr. Merrywether*, for President, Delicata (Holliday), Jessica (May), Princess Royal (Willmer), Mrs. Barnard, Green's Queen. Third, *Mr. Dodwell*, for Green's Queen, Juliet, Mrs. Barnard, Lorina, Venus (Headley), Gem (Youell). Fourth, *Mr. Bragg*, for Gem, Lady Harriett Moore, Princess Royal, Juliet, Venus, Jenny Lind. Fifth, *Mr. Bayley*, for Isabella, Mrs. Barnard, Juliet, Lorina, Venus, Princess Alice (Wood).

CLASS SHOWING.

CARNATIONS—SCARLET BIZARRES.

First, Admiral Curzon, *Mr. Bunwell*. Second do., *Mr. Haines.* Third do., *Messrs. Scholefield.* Fourth, Seedling.

CRIMSON BIZARRES.

First, second, and third, Jenny Lind, *Mr. Turner.* Fourth, Black Diamond, *Mr. Haines.*

PINK BIZARRES.

First, Prince Albert, *Mr. Bragg.* The paucity of blooms in this class prevented any further award.

PURPLE FLAKES.

First, Squire Meynell, *Mr. Buswell.* Second, Lord Byron, *Mr. Buswell.* Third, Premier, *Mr. Barringer.* Fourth, Squire Meynell, *Mr. Haines.*

SCARLET FLAKES.

First, second, third, and fourth, Duke of Devonshire, *Mr. Barringer.*

ROSE FLAKES.

First and second, Lady Ely, *Mr. Haines.* Third, Princess Royal, *Mr. Turner.* Fourth, Flora's Garland, *Mr. Haines.*

PICOTEES.—HEAVY RED-EDGED.

First, Picnic, *Mr. Harrison.* Second, Isabella, *Mr. Haines.* Third, Picnic, *Mr. Harrison.* Fourth, King James, *Messrs. Scholefield.*

LIGHT-RED.

First, Seedling, 70, *Mr. Dodwell.* Second, Paymaster, *Mr. Harrison.* Third, Gem, *Mr. Buswell.* Fourth, do., *Mr. Barringer.*

HEAVY-PURPLE.

First, second, and third, Alfred, *Mr. Dodwell.*

LIGHT-PURPLE.

First and second, Leader, *Mr. Barringer.* Third, Juliet, *Mr. Turner.* Fourth, do., *Mr. Dodwell.*

HEAVY-ROSE.

First, Green's Queen, *Mr. Turner.* Second, do., *Mr. Dodwell.* Third, Venus, *Mr. Turner.* Fourth, Victoria regina, *Mr. Turner.*

LIGHT-ROSE.

First, second, and third, Mrs. Barnard, *Mr. Dodwell.*

The premier prizes were awarded to *Mr. Turner*, of the Royal Nursery, Slough, for his stand of Southern Carnations, six magnificent specimens; and to his stand of Northern Picotees, also displaying the highest skill in cultivation, combined with the rarest quality.

SEEDLINGS.

First-class certificates were awarded to *Mr. Turner*, for Puxley's Jenny Lind, C. B., decidedly the finest of its class; to *Mr. Barringer*, for his seedling Scarlet Flake, Duke of Devonshire; to *Mr. Wood*, for Robinson's Elizabeth (heavy-red Picotee), a flower of fine properties, well margined with bright red, and extra fine in the white or ground colour; and to *Mr. Dodwell*, for Alfred (heavy purple), a variety which has obtained a number of awards altogether unprecedented. An immense number of seedlings was produced. Those especially calling for notice were Marris's Grace Darling, Countess Howe, Victoria regina, and Hollyoake's Duke of Rutland (exhibited by *Mr. Turner*), all of first-class quality, and such as will hereafter be seen in every leading stand. *Harrison's* Picnic, as shown, was too small to make a first-class flower; high cultivation may, however, remedy this.

While on the subject of Carnations and Picotees, we may state, for the information of exhibitors of those flowers, that we have reason to know that the exhibition committee of the Horticultural Society, in arranging their schedule of prizes for next year, have adopted our suggestions in the last part of this periodical, and that all Florists' flowers must be shown in pots. The prizes, as offered by us, will also be awarded in July by the Horticultural Society's censors. On this subject we shall be glad to hear the opinions of our floricultural friends.—A.

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Miscellaneous Notices.

Charms of a Garden.—The beauty of a garden is no small portion of its attraction, but it is the fragrance that has the charm which wins us. Let us step into a flower-garden after a shower of rain, when the Sweet-brier, the Mignonette, the Rose, the Stock, and the Pink or Carnation, as the case may be, all give out their perfumes, and vainly may we seek in any other scene the delightful sensations which we feel at that moment—sensations which can only be augmented in power by the companions we may have at the time. Let us go home from a crowded city, fatigued with the business of the day, and stroll into the garden, even in the dark, and the air redolent of sweets, seems to belong to another world. Who, then, would be without a garden if he had once enjoyed the pleasure? Who would neglect, among the gay and brilliant tenants of the parterre, those unassuming plants which yield the most delicious odours? The Tulip has its charms, but they are for the eye. The Pæony, the Ranunculus, and many other gaudy flowers, may light up the borders, and give a brightness to the landscape; but it is the scented flowers that waft us, as it were, into regions unlike the busy world, and remind us of the Eden which we have only read of, and fancy we have imitated. Neglect not then the Violet, and the Lily of the Valley, and the Wallflower, for they gratify the senses early; but they have hardly passed away when the Mignonette, Stock, Pink, Rose, Sweet Pea, Carnation, Heliotrope, and Clematis, follow each other in rapid succession, until the whole scene becomes desolate by frost and perhaps snow. What are the Dahlia and the Hollyhock but splendid colour and form? Effective to the sight, but destitute of perfume. Let your vacant spaces be filled with Mignonette. Have your Sweet Peas in patches about the garden. Let not Sweet-briers and

Roses be wanting, or Stocks, Pinks, and Clove Carnations, be absent. Let your odoriferous flowers begin early. The Violet will fill the air until the Hyacinth comes to load it with sweet scents; and there is no reason why there should be a cessation of perfume until the frost cuts off everything. We have seen gardens wherein all manner of beauties were placed, but the odoriferous plants and flowers were neglected, and for us and thousands of others such gardens are divested of half their charms.—*Country Gentleman.*

Grass Cloth.—At the Edinburgh Botanical Society meeting, on July 11th, Dr. Cleghorn exhibited a jacket of the Grass-cloth of commerce, manufactured from the fibres of the Bœhmeria nivea of botanists, the Urtica tenacissima of Roxburgh. The plant is cultivated in Sumatra, where Marsden says, "the shoots are cut down, dried, and beaten, after which the rind is stripped off;" the fibres so obtained are of very great strength and fineness. In Penang it is likewise cultivated; the Malay name in that island is *Rami.* Specimens sent to the Agricultural and Horticultural Society from Dr. M'Gowan of Ningpo, were found by Dr. Falconer to correspond exactly with those grown in the Botanic Garden of Calcutta, where it had been introduced from Sumatra in the days of Roxburgh, with a view to obtaining its valuable fibres. The weight of the jacket above mentioned was five ounces, and it cost three rupees. The fabric is coming into increasing consumption in South India, being imported from Singapore and China in narrow webs. It is much esteemed for light clothing during the hottest weather. Dr. Balfour also exhibited an interesting series of fibres of the same nature, fine and coarse, from different species of hemp-nettle.

THE GARDENERS' AND NATURALISTS' CALENDAR FOR SEPTEMBER.

FLOWER GARDEN.—IN-DOOR DEPARTMENT.

Conservatory.—Former directions are still available here for the early part of the month, but towards the end it will be necessary, more especially in the northern parts of the country, to prepare for getting the plants into their winter quarters. Do not, however, be in a hurry; if it continues fine and not too wet, the plants will be best out of doors. Continue to ventilate the house very freely both night and day, and discontinue shading, as the plants will require all the sun now to ripen the wood. Liquid manure may also be dispensed with for this season. Get the house thoroughly cleaned before the plants are taken in, and, if necessary, clean the flues, or repair the hot water apparatus. Have all the regular occupants of the house thoroughly cleaned; wash the Camellias and Oranges with soap and water, to eradicate and also to prevent the spread of scale and other insects. A thorough cleaning at the present time will save much time during the winter.

Orangery.—Still continue a lively growing temperature, with plenty of air, and syringe daily with clean water, unless the weather is very dull. Liquid manure may be used once more, giving a good soaking both to the borders and pots, but afterwards clean water will be sufficient. Some of the forwardest fruit will now begin to ripen, and therefore a free circulation of air is necessary to insure fine flavour. If circumstances compel you to follow the barbarous practice of turning your Orange trees out of doors during the summer, take care to get them under cover before the balls are supersaturated with the autumnal rains.

Forcing House.—Get this in readiness to commence forcing shortly, and in the mean time it may be filled with specimens to give plenty of room to the stove plants. Azaleas intended for early blooming cannot have the buds too forward at this season; indeed, if they are not tolerably strong and plump in the autumn it is vain to expect them to bloom early.

Bulbs.—To flower Hyacinth and other bulbs at Christmas, it is indispensable that they be potted before the end of the month, and be plunged in some cool place, so as to start the roots without influencing the tops. To grow them to perfection, they must have a light rich soil, and deep pots. Last year we bloomed 180 kinds of Hyacinths, but out of that quantity we had only twenty-five that were suitable for early forcing, and many of those were the common well-known kinds. Polyanthus Narcissus, are bad this season. They have been suffering from the attacks of insects for several years past, and we have the authority of one of the most extensive growers near Haarlem for saying they are inferior. Those who admire Tulips will find the yellow Duc van Tholl an excellent forcer, and deliciously sweet.

Routine.—See to the plants intended for forcing. Lilacs and Roses may be pruned towards the end of the month. Azaleas, Rhododendrons, Kalmias, &c., should be potted early too, so as to get them established, to ensure their blooming properly. Proceed with the potting of Tree and Neapolitan Violets, Pinks, Carnations, and Sweet Williams, for early forcing, and attend carefully to Mignonette, now just up, and sow another crop for succession. A.

Orchid House.—Look well to all plants that are making strong growth. See whether or not you cannot very much improve upon former years: I think you can if you try; for instance, where you used to water such things as Ansellia africana, Cyrtopodiums, Grammatophyllums, Catasetums, Peristerias, and all such strong growing things once overhead, just try the effect of three or four times on fine clear days in order to throw them into the most complete state of development, and then after a proper season of repose, the result will be most telling in the quantity of bloom they must give. Be cautious in wet weather to keep the atmosphere healthy by lighting the fire occasionally, in order to keep the air in motion. It will be well to inure the plants in this house now to a little more sunlight both morning and evening, and when the nights are cold it will be necessary to make up a little fire before going to bed. Avoid, now that the nights are getting long, throwing water about the floors and tables after mid-day.

Stove.—If you intend to excel next year in this department, let nothing be neglected now, merely because the glory in a great measure is departed, but rather to compensate for the loss of the beauties that are faded, let all be nice and clean. Persevere to get rid of all kinds of vermin which increase so fast at this season of the year, and recollect if they are allowed to spread unmolested, as is too frequently the case when the season is over, they will be ten times more trouble to keep in check in the spring. All Ixoras should be cut over without delay, and be grown on for a few weeks in a brisk dung bed with plenty of air, where this is convenient. If not approach this treatment as near as you can. Air this house freely, but shut up early to economize fuel as long as you can. J. G.

GREENHOUSE HARD-WOODED PLANTS.

If previous instructions have been duly carried out, little now remains to be done except regularly attending to watering, &c. In a general way, all specimens intended for decorating the greenhouse during winter or next spring should be nicely tied, by the beginning of this month. However, many of the Zichyas, and other climbing plants on trellises, will yet make considerable growth; these can be trained at any convenient time after the plants are housed. Should any thrifty young plants seem to want a shift it may still be done, but keep them either in the house or frame where they can be protected in case of heavy rain.

Towards the middle of the month it is a good plan to erect a temporary house or frame-work strong enough to support a few spare lights, the sides can be formed of mats. Both lights and mats may be easily removed in fine weather. Such a contrivance is an excellent place for some of the more hardy things, they will stand well in it till the end of October, and it gives plenty of room in the house for the tender, and choicer kinds.

Look well to the heating apparatus, painting, glazing &c., and have every part of the house washed, and in readiness for housing the best plants by the end of the month.

Azaleas.—Those plants that are showing the bloom buds prominently might be set out of doors for a fortnight, or three weeks; take care, however, to protect them, should anything like frost occur. Those not fairly set may still be kept as warm as possible.

Attend to the directions given for young plants as in last month.

Camellias.- These will require nothing more than a good syringing now and then, to wash off any insects or dust, that may collect on the foliage. Any plants that were inarched in spring should now be fit to take off. Secure the parts united with two or three good ties, and keep them in a close frame well shaded for two or three weeks. J. F.

Heathery.—Guard against too much wet to the specimen plants, but do not attempt to house them before the end of the month. A temporary frame with a few old lights or even a waterproof cloth thrown over them will be found an excellent protection in case of continuous rain. Potting should have been completed by this time; but, still, if any of the free growing kinds appear to require more pot room let them have it, but be cautious in watering afterwards. Many of the late blooming tricolors and ampullaceas have yet their wood to make, and while they are growing at the top, fear not but they will make way at the root. These sudden changes are very favourable to the generation of mildew, therefore keep a sharp look out upon the kinds subject to it, and sulphur them immediately. Young stock must be protected from too much wet; but let it remain in the open air for some time longer. Get the plants thoroughly cleared of dead foliage before removing them to their winter quarters. W. P. A.

GREENHOUSE SOFT-WOODED PLANTS.

Pelargoniums.—Shake clean out of the old soil, prune the roots, and re-pot into small pots, well drained, all those cut down early which have broken, and are sufficiently forward for that operation, using a good rich compost. Be careful not to over-pot them, as it is very injurious at this season of the year. Continue to put out of doors those which have gone out of flower, to harden, preparatory to cutting down. Cut down all those which have gone out of flower, if sufficiently ripened, and put in the cuttings in a cold frame, or under hand-glasses. As soon as they are rooted, pot off into small pots, and keep them close for a few days; sprinkle over-head occasionally, until well established in the pots, when they may be exposed to the full light and air, which will give them strength previous to housing in the autumn. Stir the surface soil occasionally to admit the air to the roots, which will greatly assist them. If not previously done, sow seeds of the most esteemed kinds; if large enough, pot off, into separate pots, those already up, and, as soon as established, give all the air possible. Pick out all the flowers and buds of the fancy varieties, to cause them to break into wood, these may be treated in all respects the same as the former, unless the weather should prove very wet, when they will require protection in a house or cold frame, where the lights can be removed at pleasure.

Calceolarias.—Where these have broken up sufficiently strong, shake them clean out of the old soil. divide and re-pot them into small pots well drained, in a rich, light, sandy compost, and put them in a cold, close frame, until thoroughly established. Continue to put in cuttings under hand-glasses, or in cold frames in a shaded situation, place them thin in the pots, or they will be liable to damp off. If not already done, sow seeds for spring flowering. If large enough, prick off into store pots those already up, and be careful to keep them clear of all decaying leaves and insects.

Cinerarias.—These will by this time have thrown up their suckers, which should be carefully taken off with a portion of the roots, and potted into small pots, in a good rich compost; take cuttings, and put in a cold frame; as soon as rooted, pot off into separate pots; keep them close for a few days, until they are established, then give them all the air possible. Be careful they do not get infested with insects, which a slight smoking now and then will prevent.

Chrysanthemums.—Shift into larger pots any which may require it, which will make them grow much stronger, and show finer flowers. Liquid manure may be given with advantage to such as are full of roots. Keep them clear of all small and superfluous shoots; let them stand quite thin. Support the long shoots with stakes, which will prevent accidents from high winds.

Routine.—Continue to turn heaps of compost, that they may sweeten thoroughly for autumn potting; house soils for potting which are fit for use, taking advantage of fine weather, that they may be dry. Wash dirty pots in wet weather, as clean ones are most essential for the healthy growth of plants. H. R.

FLOWER-GARDEN.—OUT-DOOR DEPARTMENT.

Viewed at a proper distance, our flower-gardens are, at the present season of the year, objects of great beauty and artistic skill; and those effects will be the more conspicuous, as there were present to the mind at planting-out time those principles which have been more than once alluded to in these directions, and which all intelligent gardeners adhere to, in the arranging and distributing of massed plants. There are people who still tell you that there are no fixed principles to regulate flower gardening; but such views can only find countenance with those who look cursorily at things, and who never think of tracing the relation which subsists between objects, so as to see wherein things agree, and in what they differ, and consequently they arrive at no directing principle. Now is the time for observation and careful attention to the different plants growing in masses or otherwise, so as to possess a sure and certain knowledge of their qualities as flower-garden plants, that when new plants come under the eye, the old may be compared with the new, and those selected out of both most expressive of intelligent effect. It is by working into our flower-garden arrangement, from year to year, those new plants adapted for such purposes, that a continued interest will be kept up, and that progress be evident in and about it suited to our advanced intelligence. The great variety of Verbenas, of purple and scarlet shades of colour, require to be gone over, and deciding on what sorts are best adapted for steady effect, discard others with their broken colours, at least for massing purposes. Scarlet Geraniums want looking at in the same way. Reed's Tedworth, Ivory's Scarlet, and Cottage Maid, are the best of the dwarf horse-shoe-leaved sorts, and will help to relieve the sameness of colour which is seen in most of our other dwarf Scarlet, Geraniums. The "Flower of the Day," and similar coloured kinds, should be set off by such as the purple Unique, or some other plants of that colour.

Propagation.—Continue putting in cuttings of scarlet Geraniums in the open border in a warm, sheltered place, and *they will soon root, or be sufficiently cal*loused over to stand the winter when potted up. Verbenas intended to stand over the winter in store pots, may be rooted from cuttings at once, taking care to select large pots for the purpose, that frequent watering may be dispensed with in winter, and also to hold a good portion of fresh loamy soil from some old pasture field for the roots to run into, leaving sufficient depth within the mouth of the pot for sandy peat, to insert the cuttings in and hold some water. They will root perfectly in a cold frame, if the frame is raised more than usual at the back, and the cuttings kept close to the glass, it being only necessary to have the cuttings rooted and cut back before the winter sets in in earnest. Petunias rooted in cutting pots should be potted off singly into small pots and well stopped back; and the same treatment applies to Lophospermums, Anagallis, and all plants that will not survive the winter in store pots. The low-growing Lobelias, Nierembergias, Cupheas, Gazanias, and I should say the Œnothera prostrata, will do perfectly in store pots, prepared after the same manner as the Verbenas, with this difference, that rather more silver-sand is necessary on the surface of the soil prepared for the reception of the cuttings. Rooted cuttings of Phloxes, and other plants of a like nature, will require to be planted out singly where they are to stand during the winter, before the frost sets in, or the temperature of the soil falls much, that they may get thoroughly established in the soil. Sow early in the month annuals for spring blooming: all those from California will answer perfectly. J. C.

Rose Garden.—The present season has been a very unfortunate one for blooming Roses; but has certainly produced most luxuriant wood, which must have every assistance to enable it to get as much ripened as possible. Tie up any shoots that are liable to be bent or broken by the wind; and cut out any very weak shoots, so as to let more light and air pass through the head; and clean out any dead leaves that may have accumulated among the shoots. By no means top any of the shoots now, as nothing can be more injurious; it will have a tendency to make the other buds start, and the lower ones, that ought to be kept in as dormant a state as possible till the winter is over, will swell, and then, if the winter happens to be very severe, they will most likely be very much hurt.

Perpetual Roses, if not done before, should be looked over to clean away the dead flowers, leaves, or any thing else that may make them look untidy; for, as they are making such fine growth, should the weather be fine we shall have an unusually gay autumnal bloom. All wild shoots and suckers must be kept continually removed as soon as they make their appearance. Those budded this season should be gone over to loosen the bandages; and, as many of the buds are growing, they must be secured against accident, and the wild shoot cut to within five or six eyes of the bud of those that are growing; but by no means try to make those grow this season that do not start of themselves. Buds may still be inserted with success in such shoots as the bark will part readily from the wood. Cuttings that have been struck in heat during the last two months must be potted off directly, and set in heat again till they have made fresh roots, when they must be removed to a cold frame to be hardened off; and as soon as they will bear it, they should be fully exposed to all fine weather; and whenever there is occasion for the lights to be on, they should be tilted up behind as high as they safely can be. From the middle to the end of the month cuttings of all the Perpetual, and with the exception of the Banksian, all the Climbing Roses may be put in under hand-glasses on a south border, where they must remain all the winter; the glasses must have a good portion of air when they are on, and must be taken off entirely on all favourable occasions, and not be shut down close till the nights are frosty. Those that were layered in summer should have the ground hoed between them two or three times during the month, as it greatly facilitates the emission of roots, particularly after such heavy rains. H. M'M.

Arboretum.—Towards the end of the month preparations should be made for the planting season, by turning over and otherwise preparing the compost heaps of loam and leaf mould, without which no choice trees ought ever to be planted. A good start is a primary object, and however congenial the natural soil may be, they will always be benefitted by some well mixed compost. October is the best month for lifting and transplanting most deciduous trees; therefore, if there is much to be done, I would recommend as many sites to be prepared this month as possible, as early planting, in my opinion, should never be omitted where there is a choice.

Shrubbery.—Here also every preparation should be made for planting where required, also the lifting and re-arranging, of old shrubberies may be commenced. I propose under this head to make a few remarks on some of the most desirable shrubs, and think I cannot do better than to give a descriptive list, commencing with that beautiful family the Magnolia, collections of which ought to be in every garden. They require to be planted in conspicuous situations and flourish well in a mixture of loam, peat, and rotten leaves.

Magnolia macrophylla, (North America, 1800). One of the finest of the genus, having a noble attractive foliage, and wonderfully beautiful flowers, some of which that I measured this season were fifteen inches in diameter; the leaves are from eighteen inches to two feet long, and eight inches broad.

Magnolia tripetala (North America, 1752). Similar to the last, but smaller both in flowers and foliage, and flowers later in the season; a very desirable species.

Magnolia glauca (North America, 1688). Although of such ancient introduction is well worth extensive cultivation. The foliage is fine, with a beautiful glaucous appearance, flowers profusely, which on a quiet evening give out a very powerful and agreeable fragrance. The variety called *Thompsoniana*, a hybrid, is similar but finer in all its parts, and should be preferred in a limited collection.

Magnolia acuminata (North America, 1736). Another very fine species, with yellowish green flowers and fine distinct foliage, inclined to grow tall and tree-like. *Magnolia Candollii* is a sub-variety with flowers of a deeper yellow.

Magnolia purpurea (Japan, 1790). This is a very hardy compact-growing shrub, with a dense deep green foliage, and a profusion of purple flowers, very handsome, and should be extensively planted.

Magnolia Kobus. Another Japan species, introduced in 1804, with pure white flowers and handsome foliage.

Magnolia conspicua (China, 1789). A very attractive species, quite hardy, the flowers appear early in spring before the foliage expands, and so great is their profusion that the tree not unfrequently appears completely clothed in pure white, fully bearing out its name. The foliage is also very fine. *M. Soulangeana* a hybrid variety, is a very desirable plant, and by many preferred because the flowers and foliage expand simultaneously.

Magnolia grandiflora (Carolina, 1734).
Magnolia grandiflora Exoniensis (N. America, 1734).
Magnolia grandiflora ferruginea (N. America, 1734).

The above three, which are the best of the grandiflora class, are too well known to need a particular description. They are more hardy than is generally supposed. I have seen them flourishing luxuriantly in the open border, and we have them growing five feet above the level of a twelve foot wall, very much exposed to cold and cutting winds, yet they both grow and flower well. J. C. R.

Carnations and Picotees.—Attend to those layered last month, which will soon be ready for potting off—in doing which the first requisite is good soil, such as good turfy loam, powdered charcoal, and sand. Manure is not required at this season. After potting a gentle watering will be required, and the plants must be placed on coal ashes in a cold frame, where they may be kept from excessive heat. As the layers are removed the heel from which they were taken should be cut close and the old plants be turned into the beds, *i.e.* if the layers are a sufficient stock for the following season. Examine the seed pods, and cut them off as they indicate ripeness, and hang them in an airy situation to get properly matured.

Dahlias now require a great share of the amateur's attention, more particularly where they are grown for exhibition. Watering, and securing the shoots are things not to be overlooked; thin away all misshapen buds, or those likely to be of no use, and also where too great a quantity exist. Light flowers are much improved in beauty by covering from the sun and air, but the darker sorts should only have a partial shade, and that but for a short time, as much of their brilliancy is lost by close coverings. Seedlings should be carefully examined, destroying those that are of inferior shape, or like the sorts already in cultivation. As the blooms fade they should be cut off, unless required for seed, as keeping the plants clear of faded flowers much assists the successive blooms.

Hollyhocks.—Secure from wind by stakes, and water as they require it. Where seed is an object, the decaying petals should be picked off, as they will be found to retain much moisture. Seed should only be saved from first-rate sorts, as a little really good seed is better than a quantity of inferior.

Pansies.—The rooted cuttings and the divisions of the old plants may now be planted out, watering as they require it. Seedlings that are blooming at this time should be marked, if found to possess any character, as many will, doubtless, improve in spring.

Pinks.—The beds intended to bloom these in next summer should be made and planted this month, as they invariably give finer flowers than those planted at a later period. To grow this tribe well, they should be well treated, the soil should be good loam well manured and deeply dug, and the plants planted a foot apart; the situation light and airy, and free from the attacks of game, as there is nothing they seem more fond of feeding upon. Where any exist, it is better to guard the plants by netting.

Ranunculuses.—Examine the roots and see they are not suffering from mould or other causes, as the bloom of the following season will be greatly deteriorated if such is the case.

Tulips.—These also should undergo another examination previous to planting; and where deficiencies occur, there is more chance of renewing, than though the orders were left till the day of planting, in which case it is often found that "delays are dangerous."

T. B.

FRUIT-GARDEN.—IN-DOOR DEPARTMENT.

Fruiting Pines.—Fires will now be requisite to assist the autumn fruit. The temperature, however, need not be very high during the night; make use of all the sun's rays you can, by early closing. A liberal allowance of air during the early part of the day, and occasional watering with soot water, or other weak liquid manure, will carry this crop on to perfection; remove fruit intended to be kept some time some days before it is perfectly ripe, and place the plants in a cool dry house.

If your system of growing Pines is in pots, now is a good time to arrange the fruiting bed for next season, which we may presume is empty, and made in order for their reception, by being refilled with fresh plunging materials. Select for the first crop those plants which have been longest potted, in accordance with our directions; allow a considerable space between the plants, and place them as near the glass as you can with safety to their leaves; they will require all the light and air you can give them from this time, with only moderate watering: see last Calendar. Where the plants are growing in the free soil of the beds, the same principles are applicable; the great object during the autumn months should be, by abundance of light and air, moderate moisture, approaching to dryness, as autumn advances, to enable the plant to organize its fluids, and get prepared by maturing its growth, for showing fruit at an early season. For *Succession Plants* look at our previous Calendar.

Vinery.—Where Grapes are required particularly early, the Vines in the early house may be pruned now, and the sashes put on the beginning of next month. Thrips are great pests in late Vineries, nothing will arrest their progress but oft-repeated fumigations with tobacco; take advantage of damp evenings for the purpose. Maintain in all houses containing Grapes slight fires occasionally, to air the houses and keep up a constant ventilation, not only to preserve the Grapes, but to prevent the mildew which is now making great ravages in places, and which increases rapidly in damp, badly ventilated houses. If it unfortunately attacks your Vines, use nothing but dry sulphur dusted on the infected parts with a pair of bellows, and keep the house dry and airy. The last crop of Grapes will be colouring towards the end of the month; reduce the moisture of the house; make fires in very wet or cold weather—more particularly if the kind of Grapes are Muscats or St. Peter's.

Vines in Pots will now be ripening their wood; gradually withhold water, using only liquid manure; take off all laterals, and expose them to all the light you are able.

Whenever any of the houses are out of work have the sashes painted, and all repairs completed before the approach of winter. J. S.

Figs.—As the first crop of this fruit will be borne on the shoots which are now being made, do not, on any account, stop them at present; the consequence of which would be to cause the embryo Figs to become too largely developed, to stand for the first crop next season. Allow them first to finish their growth, you may then stop them. Short-jointed, well-ripened wood, of moderate vigour of growth, is the certain accompaniment of fruitfulness in the Fig; and the means of obtaining which is to confine the roots, to withhold water, and to furnish all the light and air possible. With plants in pots or tubs this is easily attainable; and, with those growing in borders, the means we have just mentioned will accomplish that end.

Peaches.—The lights may now be removed from the early-forced houses for ten days or a fortnight. The weather will soon remove any leaves or filth that may be on the trees. We would not, however, leave them off after the end of the month; as, in case of heavy rains, the borders may become saturated with moisture; and, if frosty weather sets in, it will do the wood no good, though, if it be thoroughly ripened, it will not do it any injury. As we see no material benefit arising from exposure, we always have the lights on by October; for, by giving all the air possible by day and night, we attain all the advantages that can be derived from full exposure, without running risk of injury to the trees.

Strawberries.—Pay particular attention to these plants *just now*, give them liberal supplies of water, and pinch off all the runners, as soon as they appear. Any little trouble bestowed on these now will be repaid when the forcing season arrives.

In a previous Calendar we mentioned having sometimes got a good crop of late fruit, by planting out in a south border those plants which were forced very early. From a batch that was planted out the first week in May last, we have now (August 16th) a most excellent crop of Keens' Seedlings, and the plants are forming splendid crowns for next season. Thus, in addition to obtaining a good crop of fruit, there is the advantage of a year gained, by planting these instead of this year's runners. M. S.

Cucumber House.—Those plants that have been long in a bearing state will not be likely to continue so vigorous as in the early part of the season; and, as the time is now fast approaching when there must be an entirely new stock of plants to furnish the house for Christmas Cucumbers, it will not be necessary to fill up any vacancies that may occur. Previous directions as to heat and air, and keep a sharp look-out for green-fly and thrips.

Dung Bed.—Presuming that previous directions have been attended to, your plants of esteemed varieties will now be growing. The Syon House is the best winter Cucumber, and if there is not seed at hand, cuttings from clean plants will make a good substitute. Keep up a moist heat to insure a clean healthy growth, and give abundance of pot room. Allow plenty of space between the plants, to insure a healthy development. The only preparation as to soil I make is to cart it fresh from a common, break it to pieces with a spade, and, after supplying a good drainage with any faggot or brushwood, I proceed to put in the soil—rough grass and all together, without any admixture of dung or leaf mould, and using as much as sixteen or eighteen inches thick. By so doing I am never troubled with worms in the soil, and the plants continue, with few exceptions to bear fruit for ten months out of the twelve.

Melons.—In this department previous directions must be attended to. W. T.

FRUIT-GARDEN.—OUT-DOOR DEPARTMENT.

Preparations should now commence for the planting of fruit trees next month. Much depends on the soil, subsoil, and situation, as to the preparations required; but there are general principles which are of universal application, and none more so than the thorough drainage of the soil in which the trees are to be planted. This must be done carefully and well; otherwise, all other preparations will be of no avail. I shall have more to say on the subject next month.

Apples and Pears.—Gather the fruit as it arrives at maturity, which may be known by its readily leaving the tree, and also by the ends of the fruit turning brown. Great care and attention is required in gathering fruit for keeping; for, if gathered too soon, it will shrivel, and if allowed to remain on the tree beyond the period of maturity, much of the best fruit will fall at the time of gathering, if not before, and hence become useless for keeping. Some gardeners make two or three gatherings of the fruit of a tree, others, on the contrary, have a general gathering of all sorts at the same time; the first is quite unnecessary for keeping sorts, the last most injurious to the keeping and flavour of the fruit. With regard to storing, it is most objectionable to lay the fruit in heaps to sweat it. Immediately after gathering, Pears should be laid singly, and Apples not more than two or three deep; the fruit can then be examined without bruising. A fruit-room should be cool, dry, and not subject to much variation of temperature. All heating apparatus should be dispensed with if possible; the shelves to be made with the best white deal, cut into slips, and the slips put half an inch apart. Put no straw or other material beneath the fruit. The laterals of wall and espalier trees may now be cut in pretty closely, there being no danger of their breaking at the base of the shoots.

Peach and Nectarine.—The shoots intended for future bearing must now be kept closely nailed in, and all the laterals not required, must be removed, so that the fruit has the full benefit of the sun from which it derives both colour and flavour. A few of the leaves that shade the fruit may also be removed, as it is necessary to give it every advantage possible, it generally being backward this year. The same means should be adopted for catching the falling fruit that I recommended for Apricots last month. Should insects be troublesome, the trees may be washed with clear water, but no mixture must be used until the fruit is gathered.

Filbert.—To preserve this fruit in good condition, it should not be gathered until thoroughly ripe, which may be known by the husk or calyx turning brown, and by the nut readily leaving it. The fruit must be thoroughly dry when gathered, and after laying thinly in a dry airy room for a week or two, they may be stored away in a cellar, which I have found to keep the kernel plump; whereas, if stored in a dry and airy room for any length of time, the kernel becomes shriveled.

Grape Vine.—It is now necessary that the fruit have all the sun and warmth it is possible to give it. All unnecessary shoots must be removed, and also a few of the leaves that shade the fruit. If a few lights from the frames could be spared, a temporary structure might be put up, which would greatly hasten the process of ripening; and the trouble would be amply repaid by the superior quality of the fruit. All available means must be used to keep wasps from it, as they always attack the best bunches. I think they are not very numerous this year; I have seen but two during the last two months. I paid for all the Queens brought me, to the end of June; which, perhaps, may account for their scarcity here.

Gooseberry and Currant.—Those that are matted for late use should have the mats taken off, in order to remove the dead leaves; which, if allowed to remain, will in a short time cause the fruit to turn mouldy, and rot. The mats may afterwards be replaced.

Plum and Cherry.—The late sorts of the former, such as Coe's Golden Drop, and the Imperatrice, should be covered with Hexagon netting, to preserve the fruit from birds and wasps. The Imperatrice will hang on the tree very late, and is a most delicious fruit, even when shrivelled. The Morello Cherry tree is frequently much injured when the fruit is gathered, long strings of the bark being plucked from the branches with the fruit. To obviate this, the fruit should be cut off with a pair of scissors.

Strawberry.—The Alpines should now be in full bearing, if proper attention has been paid to the plants. If seedlings are preferred for planting, a few of the finest fruit, fully ripened, should be saved for seed. They may be rubbed on a piece of slate or glass, so that the pulp may dry up, when the seeds can be rubbed off, and preserved until the time of sowing. If runners are preferred, which is the only mode of having the plants true, a sufficient quantity should be allowed to grow, but no more, as the fruit is largest and best where the runners are kept trimmed off. J. C. O.

KITCHEN GARDEN.

As the principal part of the cropping is over for this season, every attention should be given to all kinds of vegetables, and their growth encouraged as much as possible, by hoeing and stirring the soil between them; and, where slugs are plentiful, a sowing of lime and soot should be made, which will effectually counteract any further injuries. The earthing up of Celery, and the various kinds of Brassica will now demand attention. The Spinach sown last month should be thinned out at proper distances, not less than six inches apart; where not sown last month, a piece may still be got in on any warm richly manured spot. Early sown Cabbage, and Cauliflowers will require to be pricked out as they advance, the former in nursery beds, the latter under hand-glasses and in frames, or even at the foot of a south wall they will do very well, providing they are not wet at the root. Sow Mustard and Cress every week, and Radishes on a south border every fortnight till the middle of October. Tie up Endive to blanch, and transplant another piece for a late supply. A small batch of Lettuces similarly treated would be of great use if a slight protection could be afforded throughout the winter. The harvesting of the general crop of Onions will take place this month. Should the weather prove wet, let them be carried at once to open sheds, as they will be found to keep better than if allowed to remain a few days on the ground. Towards the end of the month prepare Mushroom beds. I have found them to answer well in several ways; but I believe the best way is to collect a quantity of cow-dung, an equal quantity of horse-droppings, and some old litter that has been taken off the outside of a hotbed. Mix these well together, and turn frequently to prevent a too violent fermentation before making up and spawning. I have always earthed the surface of the beds when the thermometer stood at 80 deg. Fah. J. C. S.

WILD FLOWERS OF SEPTEMBER.

The chief glories of the flowering tribes are now departing, and only here and there a straggler from the main body heralds the approach of the rough, blustering months of autumn, soon following on to tinge the face of vegetation with brown and yellow hues, sure sign of the cessation of active vitality; the buds in the axils of the leaves, now no longer push forth into branches in the perennial plants, but become encased in the various non-conducting coverings destined to protect them through the winter. It is true that vegetable life is still tolerably active through September, but generally speaking the signs of decadence, to be more strongly marked in October, are already to be clearly detected.

It is fully worth while for the young botanist to direct his attention in this month to the forms of the fruits of the various tribes, to trace the nature of the changes which the germen has undergone, and to examine the forms of dehiscence. The dry and withering stems now so abundant in every hedge will in this way still yield material for the active observer, and many very interesting points may be met with, and verified by actual inspection.

Attention should be paid also to the modes of persistence of the herbaceous perennials, whether the next year's growth is axillary or terminal on the old stem, &c. &c.

A few plants are perhaps to be considered peculiar to this month, such as the Colchicum autumnale, Crocus nudiflorus, the Ivy, and one or two others.—A. H.

ANIMAL KINGDOM.

Ornithology.—How swiftly time glides by. It appears but as yesterday since we were welcoming to our shores those little beings which are now bidding us farewell, many never to return; and who amongst us can say that he will again hail with delight the Cuckoo's gladsome note, or listen in silent rapture to the rich melody of the Nightingale? For life is but leased to man, it is not his freehold. A feeling of melancholy is apt to weigh upon the spirits when, wandering amongst well-known spots, we miss the sweet notes that have cheered our daily walks, and look in vain for a glimpse of those fairy forms which have so often delighted us with their lively actions. In imagination we may track them on their weary journey, now braving the rolling billows of the briny ocean, now battling with the mountain's blast; but still holding on their course, surmounting every obstacle, for the hand that guides and directs them is Divine.

This month makes a sad gap amongst our summer friends, indeed it leaves us but a few solitary stragglers, who, either from accident or disease, are unwilling dwellers with us; for, with the exception of some of the Swallow tribe, it is rarely that any of our summer birds are either seen or heard after this month. I have, however, a note made under date of the 8th of December, 1846, of a male Black Cap (*Curruca atracapilla*) being brought me on that day. It had been captured in a common trap cage, the bird was in beautiful plumage, and showed no signs of being in any way diseased, or that it had been a caged bird; the weather up to that time had been mild and open, but on the 10th frost set in, attended with snow, in which no doubt the poor bird would have perished had it been at large. It is certainly a puzzle to account for those occasional stragglers remaining so long after all their friends and relations have departed. I suppose we must consider them in the light of outcasts; and no doubt it was this occasional appearance amongst the Swallow tribe, that warped the immortal White so strongly in his opinion of their hibernation.

Towards the end of the month the Swallows (*Hirundo rustica*), and Martins (*Hirundo urbica*), congregate in large numbers, as if to consult upon their migration. They generally select the roof of some tall building, choosing that side which is exposed to the morning sun; for, until warmed by his genial rays, they appear in a half dormant state, almost incapable of either flight or motion. That these large assemblies collect during the night I am convinced, for buildings around which not a Swallow was to be seen the evening before, and hardly one in the neighbourhood, I have found swarming with them by daybreak the next morning. They generally remain for two or three hours after sunrise, when they gradually disperse in small parties, rarely moving off all at the same time. I have seen them thus congregated also upon the branches of a decayed tree.

About this time the Robins (*Erythaca rubecula*) leave their woodland haunts and approach nearer the dwellings of man; fierce conflicts now often take place amongst them for the possession of certain districts, and when one has once established his right to a particular spot, he allows of no intruders, fiercely attacking all that dare to invade his territory. His animosity is principally directed against those of his own species.—H. W.

Entomology.—The decreasing temperature of the season has a visible effect on the insect tribes, the number of species of which is now greatly diminished. Some of the more hardy species of Butterflies still, however, impart a charm to the scene, the Dahlia, and especially the China Aster, attracting different species of Vanessa, such as the Peacock (*V. Io*), the small Tortoise-shell (*V. urticæ*), and especially the Red Admiral (*V. Atalanta*), which is also extremely partial to the flowers of the Ivy. The small Heath Butterfly (*Hipparchia Pamphilus*) and the wall Butterfly (*Megæra*) still frequent heaths and lanes, and the Humming-bird Hawk Moth is again seen in gardens at the close of the month, as well as its gigantic relative the Convolvulus Hawk Moth, which looks more like a small bird than an insect whilst hovering over some long-tubed flower, into which it thrusts its singularly elongated spiral tongue, which is a couple of inches in length. The little Vapourer Moth (*Orgyia antiqua*) may also now be seen flitting about in the sunshine, even frequenting the streets and squares of the Metropolis. The odd English name of this species is very expressive of its curious flight, or, to speak more properly, of that of the male, for the female is a large, sluggish, wingless creature (or rather with the merest rudiments of wings), which, after quitting the chrysalis state, never travels further than the outside of her cocoon on which she deposits her eggs, the Caterpillars hatched from which in the following spring are some of the gardener's worst enemies, feeding upon the leaves of fruit-trees.

Many species of Noctuidæ, and especially of Tortricidæ, are also now to be met with in woods and hedges, and are to be obtained by beating the underwood and hedges with a stick into the collecting net; and it is during this month that the last general brood of Caterpillars is to be found, each in its different habitat. The plan of laying down a sheet under trees, and then beating the boughs, must be resorted to for collecting these caterpillars, some of which remain in this state until the following spring, being more difficult to rear, but the greater part go into the chrysalis state before the approach of winter; many of these burrow into the earth at the foot of the breeding cage, which must be kept moist. The Caterpillar of the great Death's-head Moth is also now to be met with upon Potatoes, as well as upon the Jasmine. It is a very beautiful creature, being of a delicate green colour with lilac stripes down the sides of the body; when full grown it is as large as a man's finger, and is often found by the market-gardeners' labourers, who regard it as some strange monster, the discovery of which is often recorded in the local newspapers.

Amongst the Beetles several species of Carabidæ are now to be found in Corn-fields, running about the footpaths. Amongst these Zabrus gibbus is one of the most interesting, from its habit of ascending the stems of Corn, and feeding on the young ears at an earlier period of the season. The larvæ also of this insect, upon the authority of Germar and other German naturalists, feed during the night upon the young shoots of the Wheat, occasionally doing great mischief, as in the instance recorded by Germar, where 230 acres of Wheat, in the canton of Seeburg, near Halle, were destroyed by it. These larvæ are hatched from eggs deposited, a short time previously, in the ground by the female, and during the day they were observed to bury themselves in the earth several inches deep; they remain about three years in the larvæ state, and attain the full size in June, when they form for themselves an oval cavity in the earth, sometimes two feet deep, in which they become pupæ, appearing in the perfect state in the space of a month.

A considerable number of Lady-birds (*Coccinellidæ*) may now be observed, often entering our apartments, and seeking some secure dark corner in which they may pass the winter. The great services they perform in destroying myriads of Plant-lice (*Aphides*) ought to insure them shelter and protection.

This is also the chief season for the interesting species of insects known under the common name of Grasshoppers, but which belong to two different families, independently of that of the Crickets (*Achetidæ*). All these insects possess, in addition to their wonderful powers of leaping (which are effected by means of their long and very strong hind-legs), the faculty of producing sounds, differing in the different kinds, but which exists in the males alone. In the males of the House-cricket we perceive, near the base of one of the wing-covers, a thickened point, whence several strong veins diverge, forming an angle from this point, the strongest of which is regularly notched on the underside like a file; when the wings are closed, this notched bar of one wing-cover rests obliquely on the upper side of a corresponding bar of the other wing-cover; and, when a tremulous motion is imparted to the wing-covers, the bars are rubbed together, producing a vibration which is communicated to the other parts of the wing-covers, which, being divided into a number of irregular spaces, have each a distinct vibration, accompanied by a separate sound, which collectively forms the stridulation or chirping so well known.

This is the mode in which the sound is also produced in the Grasshoppers with long antennæ (*Gryllidæ*), except that the areas of the base of the wing-covers are larger, and covered with a delicate tail-like membrane. In the more numerous tribes of Grasshoppers with short antennæ, (belonging to the same family as the destructive Locusts of the East, *Locustidæ*), the powers of stridulation are performed by the motion of the hind-thighs, either conjointly or alternately rubbing against the sides of the wing-covers, the insect resting on its four fore-legs, the veins of the wing-covers being considerably elevated, so as to be easily acted upon by the rugose inner edge of the thigh. Some species may be perceived occasionally to execute this movement without producing any sound perceptible to our ears, but which M. Goureau thinks may still be perceptible to their companions. Most of the species of the family have, moreover, on each side of the body, near the base of the abdomen, a large cavity, covered with a very delicate white membrane, which Latreille considered was also a portion of the apparatus for producing the sound.

The object of all this music is the calling of the females. It is kept up till late in the evening, especially by the large green Grasshopper (*Gryllus viridissimus*), by far the largest species in this country.

> "So chirps the Grasshopper one good-night carol more:
> He is an evening reveller, who makes
> His life an infancy, and sings his fill."
>
> *Childe Harold.*

In addition to the Bee-like Helophili, which now frequent the autumnal flowers in great quantities, the order of Dipterous insects (two-winged flies) affords a very troublesome species at this season of the year, namely, the Stomoxys irritares—a fly so like the common domestic fly that an inexperienced observer would pronounce them identical. The Stomoxys, however, has the front of the head furnished with a horny, very slender, elongated proboscis, which it thrusts into our flesh without fear, and woe be to the gourmand who should fall asleep over his glass of wine in an apartment where these insects occur. He will be sure to be assaulted by these little blood-thirsty creatures, clothes forming no defence against their attacks. J. O. W.

MYRTUS TOMENTOSA.

Nat. Order, Myrtaceæ.

Generic Character.—Myrtus, *Tournefort*. *Calyx* adherent to the ovary, limb superior, four or five-toothed. *Corolla* of four or five petals inserted on the throat of the calyx, alternate with its lobes. *Stamens* indefinite, most frequently numerous, inserted in several rows on the throat of the calyx and the epigynous disk; *filaments* filiform, free; *anthers* two-celled, affixed by their backs, bursting longitudinally. *Ovary* inferior, two-, three-, or more rarely four-celled; placenta generally two-parted, in the internal angle of the cells, the inner face with many ovules, rarely undivided and with two ovules; *style*, simple; *stigma* terminal. *Berry* crowned by the limb of the calyx, two-, three-, or rarely four-celled, sometimes one-seeded by suppression. *Seeds* mostly hippocrepic, testa generally bony.- (*Endlicher Gen. Plant*, 6316).

Sect. II., *Rhodomyrtus*.—Flowers rose-coloured; seeds flat, compressed, in two series in the cells.

Myrtus tomentosa, *Aiton*. Woolly Myrtle.—Peduncles one-, three-flowered, shorter than the subjacent leaf, bearing two ovate bracteoles, branches and calices velvety, leaves ovate, when young velvety above and hoary-tomentose beneath, three-nerved, lateral nerves sub-marginal, calyx five-toothed.—*Aiton*, *Hort. Kew*, 2. p. 267.

Synonymes.—*M. tomentosa*, *Curt. Bot. Mag.* t. 250—*Herb. Amat.* t. 207.—*M. canescens*, *Lour. coch.* 1 p. 281.—? *Pluk. alm.* t. 372, f. 1.

Description.—A small shrub, with a tendency to dichotomous branching; shoots slightly hairy. Leaves opposite, lanceolate, shortly stalked, three-nerved, the lateral nerves leaving the mid-nerve a little above the base and running up, about the same distance within the margin, to the summit; young leaves and buds velvety hoary beneath, with a thinner pubescence above, full-grown leaves glabrous on both sides, glandular punctate in the areolæ of the reticulations of the nerves. Peduncles one-, three-flowered, and, like the calyx, hoary. Calyx-tube campanulate, adherent to the ovary, and with a pair of sessile bracteoles, one-third its length, at the base, the limb spreading, five-parted, the lobes broadly and obtusely spathulate (broader than long), imbricated. Petals large, rose-coloured, fading to whitish, broadly oval with a short claw, concave. Stamens very numerous, inserted on the tube of the calyx and the epigynous disk: filaments somewhat incurved, rose-coloured, pollen yellow. Ovary inferior, three-celled; seeds numerous, in two rows in the inner angles of the cells; style simple, longer than the stamens, rose-coloured above; stigma globular capitate.

History, &c.—A native of China, Cochin China, and the Neilgherry Mountains, long since introduced into gardens, but apparently not very generally known.—A. H.

Culture.—Although this is an old plant it is a rare occurrence to see it properly cultivated, and producing its very pretty rose-coloured flowers in such profusion as it will do under proper management. It is a very handsome stove shrub, flowering early in the season, and continuing for some time in perfection. It is readily propagated by cuttings of the young wood, under a bell-glass on a gentle bottom heat, and it strikes the best when the young wood is about half ripe; make choice of the short stubby pieces, and take them off with a heel, that is, with a portion of the parent branch adhering to the base of the cutting. When they are rooted, which will generally be in about six weeks or two months, pot off singly, and nurse in a warm frame until thoroughly established. Afterwards harden the plants off, and grow them in the stove. Of course, if good plants are desired, the young ones must be stopped to make them bushy, and they must be grown very vigorously. A mixture of loam, leaf-mould, and peat, with plenty of sand, will be found very suitable to pot them in. Water liberally and occasionally in the growing season with liquid manure, but recollect the blooming of this, as well as of all other hard-wooded plants, depends upon the wood being properly matured in the autumn; therefore attend to it in time.—A.

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LARGE TREES: HOW AND WHEN TO REMOVE THEM.

By Mr. J. L. Middlemiss, Gardener to A. Pott, Esq., Bentham Hill, Tonbridge Wells.

To be able to give immediate effect in a landscape, by transplanting large evergreens and forest trees has now become a *sine qua non* in the qualifications of a gardener; and the present paper, which it is not intended should be considered as offering instruction to those who are more able to give than receive in such matters, may perhaps be found useful as containing a few suggestions to those who are seeking information.

On the first part of this subject eminent authorities differ; some advocating winter and spring planting, some summer, and others autumn. It is not my intention in this paper to enter into the merits or demerits of either of these periods; but I may remark that winter and early spring seem to me to be the worst of all times for transplanting large evergreens and deciduous trees, that being the season when almost all trees are, comparatively, in a state of rest, and consequently, when disturbed, the roots must suffer from having to remain a considerable time in an inactive state from not being able to take proper hold of the new soil in which they are placed. A gardener who would begin a general shifting of his plants when they were in a comparative state of torpidity, and who expected by such means to exhibit specimens of the most perfect cultivation, would certainly not be considered quite up to the mark as regards his reflective faculties. It appears to me that this has a bearing on the case before us. Why should we consider it best to remove large trees when they are in a torpid state, and yet condemn the man who would shift his plants when in a state of rest? This seems to me irreconcilable with sound reason:—surely no one can think it is right to transplant trees when torpid, and wrong to pot plants when in the same state. A knowledge of the laws which act in the vegetable economy would lead one to infer that the former system is equally wrong with the latter. Would it be proper, then, to remove large trees in summer, when they were in their most active state? Most assuredly it would be proper, and the best of all times, provided we had such a command over the atmosphere as to prevent a too great drain on the mutilated roots, for the supply of the leaves in the process of perspiration, caused by the powerful influence of the sun's rays on their porous tissues. By shading to prevent evaporation, and by causing an artificial moist atmosphere around the objects of our care, we might succeed; but then here is the difficulty. Where a considerable number of large trees are to be removed, it would be out of the question to think of shading them, and if they get a supply of water at the roots, they would perhaps have to remain contented. It behoves us, then, to look for a period when the tree is neither in a torpid state, nor in its most active growth, nor when the sun's rays are so destructively powerful on trees unprepared with a sufficient supply of evaporative matter from the roots to satisfy the demands made upon it by a hot dry atmosphere, and we shall find that from the middle of August to the end of September is the best period, as providing for the circumstances of our case. Here I may remark that my experience is very much in favour of autumn planting, as a proof of which I beg to offer the following experiment. But first I may add, that if my humble testimony be of any service to the course of autumn planting, I freely give it, having had on many occasions to remark the superiority of autumn-planted trees over those planted at any other time.

On the estate of a nobleman in the north of England, circumstances required that a number of large trees should either be cut down, or removed altogether, and be transplanted, to admit of a carriage drive being formed through the plantation of some fifty years' growth, in which they were growing. Some part of the drive being through an open park, it was suggested to remove and transplant a number of trees for immediate effect in connection with the drive. The question then arose—When is the best time to remove them? and it was decided to remove half of them then, the middle of August, and the other half in February and March following, the drive not being required to be finished till the following summer. Accordingly, half were removed, and transplanted from the middle of August to the end of September, and the other half in February and March following. I may remark that equal care was taken with both lots, and the only difference in treatment was, that those planted in the autumn were frequently moistened all over their leaves with the garden engine. This happened about ten years back, and from a letter now before me, written three years since, I take the following:—"You will be glad to learn that the majority of the trees you helped to remove are doing very well. Ten per cent. of those removed in spring died, while only four per cent. of those removed in autumn. This, I think tends to strengthen the opinion you have often heard me express, that autumn is the best time to remove large evergreens and forest trees." Since this it has frequently fallen to my part to remove large trees and shrubs, and I have been more firmly convinced of the correctness of the above opinion by the superiority in every case that has come under my notice of autumn-planted trees over winter and spring-planted ones. Still, however, there may be those who will doubt the correctness of this doctrine; and, as time alone can demonstrate the correct practice, and it will too, I will not attempt to strengthen my argument, further than to say that what I have stated is founded on practice guided by theory. I will now proceed to make a few remarks on the more practical part of the subject, viz., how to remove large trees.

I believe it is possible to remove and transplant the largest tree in England, provided an apparatus strong enough were used, but as I do not intend in this paper to show how this might be done, I will proceed to deal with trees of a medium size, say from thirty to forty feet high, and proportionately clothed with branches. The first thing that we must attend to, then, is to get the tree up; and here

I may remark that, provided the tree could be so fixed in its new situation as to prevent the wind moving it, a large ball is not necessary, unless indeed, a ball sufficiently large to carry all the roots with it could be removed. This would be a matter of considerable difficulty and expense, and therefore I say a ball is not indispensable. If this were properly understood, much of that expense which now attends the moving of large trees might be dispensed with; but then the tree must be carefully removed, and as carefully put in its new place, or success is hopeless. The proper way to prepare the the tree for removal, is to commence at the very extremity of the roots, and pick and clear away all soil from them, taking, at the same time, the greatest care not to cut the roots, and they should be tied up and carefully covered with damp mats to prevent their getting dried. When you have got so far as it is intended, to leave a ball to aid in fixing the tree in its new place—and where it is generally the practice to begin to take up a tree by digging a trench round it, and smashing through every root, without thinking that they are cutting off the sources from whence the tree in its new position would derive the very life-blood of its existence—it will be necessary to pick under the ball to get at and cut the tap roots, and having done this, the tree may be lifted out of its place. The machine being provided, place the tree upon it, and then it may be removed to the place intended to receive it. The hole should be sufficiently large to admit of every root being spread out at full length, and not only that, but it should be well loosened up at bottom, at least a foot deep, to facilitate the easy escape of superfluous water. I need scarcely say all land upon which trees are to be planted should be thoroughly drained. These precautions having been adopted, proceed to fill in the soil, which must be of good quality, carefully putting it down amongst the roots, using plenty of water to consolidate it as you proceed: do not be afraid of giving too much, it will soon soak away if the hole has been properly prepared; in fact, the late Mr. McNab, a high authority, recommended the soil to be made wet enough to be almost like thick paint. In filling in the soil, avoid the absurd, though very general practice of moving the tree backwards and forwards to get the soil down among the roots. This I have called an absurd practice, for every pull you give the top draws the roots out of their places, and when the tree goes back into its proper place, the roots being unable to push themselves back again, remain doubled up under the tree, thus thwarting the object you had in view of spreading the roots carefully out at the commencement. It will be necessary to fill in a little higher all round to allow for sinking, and when this is finished, the tree should immediately be propped up to prevent the wind moving it, or otherwise, if left till the next day, you may find it lying on its side. If it has been removed with the leaves on, it will be necessary frequently to syringe it all over, and if the weather be dry, occasional watering at the roots will be indispensable. Above all things take care of the small fibres in taking the tree up and planting it, and success will be almost certain. In the following spring the ground for some distance round the trees should be trenched two feet deep, the young roots will then easily penetrate it.

SOME HINTS ON BUDDING ROSES.

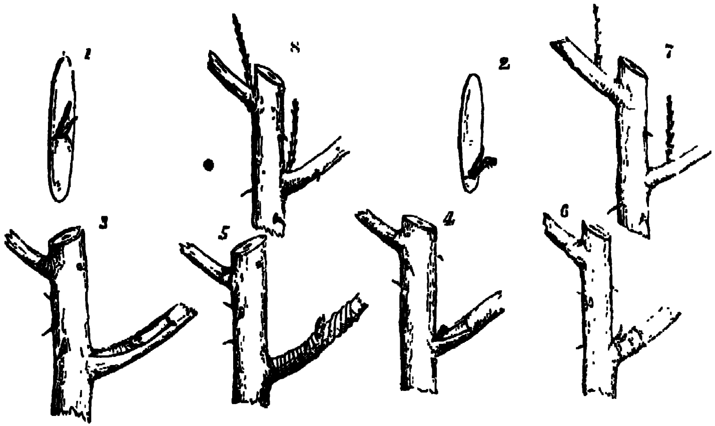
By Mr. J. Saul, Durdham Down Nursery, Bristol.

WHAT is the best weather for budding? I am told damp cloudy weather is. How often would such a question, asked by an amateur, obtain such an answer? How startling, therefore, to him to be informed to the contrary! Why, he has seen it recommended in books! Yes, nothing more generally recommended than damp cloudy weather for budding! To say bright warm sunny weather is best, provided the stocks are in proper condition, will sound like heresy; *extensive experience*, however, tells me such is the case. I may be asked why? And I would answer, that in warm weather the sap is more gelatinous; and the bud, on being extracted and inserted in the stock quickly, properly tied, &c., soon takes. On the contrary, in wet cloudy weather the sap is more thin and watery, and the bud will not unite so freely. To this we add that a fall of rain—likely in such weather—after the buds are inserted, will fill up the incisions, and thereby rot and perish the buds before they have time to unite with the stocks. Not only is clear warm weather best for the experienced budder, but likewise for the amateur and tyro.

Another question is common: Is it necessary to extract the wood from the bud? I answer, yes; whilst American writers say, no! The Americans, indeed, work nearly all their fruit trees, ornamental trees, Roses, &c., with the wood left in the bud as cut from the shoot; this may best suit their hot dry climate, but after giving it repeated and extensive trials, I must give the preference to our *old system* of extracting the wood from the bud, not only for Roses but ornamental trees, forest trees, &c.; for in our comparatively cool moist climate it answers better. In all cases where they have been tried, the failures have been much more considerable under the American system than under the old, the circumstances being equal. Sometimes there may be an advantage in putting in the wood—namely, where the shoot is become firm, and the wood and bark will not freely separate; then, if inserted in a free-growing stock, it will in all probability take.

In budding, the top bud on the shoot should be commenced with, cutting from about an eighth of an inch below the bud or eye to from half an inch to an inch above it, in order that there may be a sufficiency of bark to hold with the fingers without rubbing the portion which is to be inserted, (shown in Fig. 2); take out the wood as already recommended; next make an incision in the shoot of the stock close into the main stem, and about half an inch long—this is long enough; cut across at top, raise the bark with the end of the budding knife without bruising it, and insert the bud, which will then have the appearance of Fig. 4. It is now to be tied with a little worsted or cotton, as shown in Fig. 6; one tie below the eye and two above will be ample, as its entire length will not be more than half an inch, and a quarter of that below the eye. The most inexperienced amateur need not give more than two rounds below the eye and three above, but the practical workman will find the number I have mentioned sufficient.

The superiority of this system of budding over the old must be apparent. Fig. 1 shows a bud extracted on the old method, the whole more than an inch in length. Fig. 3 shows the same inserted, and Fig. 5 the same tied in with innumerable rounds of matting. Fig. 7 shows it the following season, the buds having grown. Fig. 8 represents the growth which the buds take on the new system; they grow out nearly from the axil of the branch, and look neat and workmanlike; and after a season or two, when the shoots are headed back and healed over, which they freely do, they have the appearance of growing out of the main stem, forming neat heads without scars, wounds, or knots, very different to the appearance of those worked like Fig. 7, which have an unsightly and unworkmanlike appearance, and liable to be blown out by the wind, having scars and dead snags in abundance, and never forming such neat, compact, and clean, healthy heads. Those who are acquainted with budding will easily understand this from the figures. I have purposely shown the one year shoots in Figs. 7 and 8, as if they had not been stopped the first season, to explain the system. When strong, however, they had always better be stopped the first season when they attain from one inch and a-half to two inches in length, repeating it as the growth proceeds. In this way, by the end of the first season from the bud the heads will be fine and bushy; which will not be the case if they are allowed to run up with single shoots.



BUDDING: OLD PLAN, FIGS. 1, 3, 5, 7; NEW PLAN, FIGS. 2, 4, 6, 8.

I should have said that the shoots selected for budding must be pretty firm—young watery shoots and buds are useless; from the former the buds always take more freely provided they only separate readily from the wood. For tying, worsted or cotton is in every way incomparably better than matting. Cotton I consider best of all; it is much cheaper, more expeditious in use, does not cut the bark as much as matting, and requires nothing more than cutting into lengths of from four to six inches to be ready for use; the former length will be sufficient for the experienced; whilst the tyro may require it of the latter length. Lamp-wick answers for this purpose, but it requires splitting as it is generally too thick; about the substance of strong yarn is sufficient. Suitable yarn may be obtained of any dealer in cotton, or at a very cheap rate from any cotton manufactory where they sell retail. All things in these nurseries which are budded are now tied with cotton—Roses, ornamental trees, shrubs, fruit trees, &c.; it is found much cheaper than matting at the first cost, and matting requires much more labour in cutting, splitting, wetting, &c., before it is used; cotton, on the contrary, requires only cutting in lengths, when it is ready for use; it can be employed more expeditiously, and is more efficient.

THE MIMULUS AS A DECORATIVE PLANT.

By Mr. H. ROSIER, Brooklands Nursery, Blackheath.

THIS gay and beautiful tribe appears not to be so extensively cultivated as its merits deserve, for among them are a number of varieties of great beauty, spotted and pencilled in many shades of colour, and for the decoration of the conservatory or greenhouse in the early part of the season, they will be found among soft-wooded plants a great acquisition. It can with proper management, by taking cuttings or suckers at different periods, be made to give its beautiful flowers from early spring until late autumn, and make a great display.

In the few remarks which I am about to make on its cultivation, I will mention a few of the most showy and distinct varieties, as a guide for those who are unacquainted with the better kinds :—

Conductor.—A fine bold orange, with deep chocolate marking on the lip, the finest of the very dark ones.

Harlequin.—A bright lemon colour, with clearly defined brown spots, very large and strong habit.

Picta.—A cream colour, spotted all over with bright chocolate, very novel and striking in appearance, and will be found a most desirable variety.

Formosa elegans.—Yellow with brown marbled marking, a good bold flower.

Moodyii.—A fine bold orange with brown spots.

Rubina.—A finely formed flower, deep lemon colour spotted in the throat, and edged or banded with bright crimson.

If large plants and fine flowers are the objects aimed at, high cultivation is necessary to produce them.

When once started into growth in the spring, care must be taken that they do not receive a check, which will at once throw them into flower. I have found the beginning of February the best time for starting them. When they have grown about an inch take strong cuttings, or the suckers already rooted, and insert them in small pots, one in each, in a good rich compost, with plenty of river sand incorporated, for being river plants they delight in this. Place them on a slight hot-bed, or put them in a warm house, to give them a fair start as soon as they are rooted, which will be in a short time, and water liberally, never allowing them to get dry. As soon as the roots have got to the outside of the pots a liberal shift may be given, and after a few days they should be stopped, which will cause them to throw out strong side branches, which, when long enough, must be supported by sticks to secure them from accident by wind, and other causes.

MIMULUS McLAINII.

The compost I have found them do best in, is a mixture of good maiden loam, and well decomposed cow-dung, with plenty of river or silver sand. Pinch out the first flowers, for if allowed to flower in too early a stage it weakens them, and they will not grow half so large. If they grow vigorously which they should do under good treatment, they will require shifting every three or four weeks, until they are in pots large enough, which should be eight or eleven inch pots for fine specimens. When they have made their growth, place them in a cool and shady place in the greenhouse or conservatory, where they will get a free circulation of air, and they will be found to be objects of great beauty for a long time. Seeds collected and sown early in the spring make fine plants, and produce a great many striking and novel varieties.

This plant will also be found most useful for the flower garden, as it forms a gay and striking bed in shady and wet situations, where other plants will not succeed, and added to their beautiful tints many of them besides the common Musk (*Mimulus moschatus*), have very fragrant foliage, and will be found in the evening, or after a shower to give out a very agreeable musky odour. They will also be found very pretty on the edges of ornamental water, where they thrive well, this being their natural element. Cardinalis and its varieties, with their brilliant scarlet and crimson flowers, form beautiful shrubby plants, and are very effective through the autumn months; being hardy perennials they are well suited for borders, as well as for pots. The engraving represents a variety of this section called, M. McLainii. *It is remarkable for the deep marking in the throat.*

SOILS, THEIR SELECTION AND HARVESTING.

IF, in the cultivation of plants, one thing is more necessary than another to be attended to, that thing is the proper preparation of soils and composts; for, however great the care bestowed upon the potting and watering of a plant may be, if the soil is unsuitable, or not in a proper condition to supply the requirements of the plants, we well know that every other care is thrown away; but if the soil is suitable it is surprising with what tenacity a plant will cling to existence, under very unfavourable circumstances. Every person who has paid any attention to the management of plants knows that in the open garden as well as in pots, the sweeter the soil is, that is, the more it has been exposed to the ameliorating influence of atmospheric changes, the more suitable it becomes for all horticultural purposes. Even maiden soil, fresh from an upland pasture, where it is well drained, is materially improved by exposure to atmospheric changes for a few months, while in the case of soil from a wet locality, it should never, under any circumstances, be used in the cultivation of choice plants until it has been exposed to the varied changes of an English winter; and if, afterwards, it can have a few months exposure through the summer, it will be much improved thereby. This improvement arises principally from the expulsion of deleterious matters, the decomposition of vegetable substances, and the thorough disintegration of the mass of soil. When a soil is very strong or adhesive, it is necessary to expose it in thin layers to the action of a winter's frost, taking care to remove the frozen parts, or outer surface of the soil, as often as it becomes frozen of sufficient thickness, and placing it afterwards where it can be thoroughly dried. Soil thus prepared will generally be found clear of insects, which is a matter of considerable importance in the growth of choice plants.

Now of soils required for the culture of hard-wooded plants, peat and a good fibrous hazel loam are the main requisites. In the whole horticultural vocabulary, perhaps, there is not a word so little understood as that word peat, nor a word upon which so many erroneous notions exist. Indeed, it might be laid down as an axiom, "show me your soils, and I will tell you what kind of a cultivator you are," and so confident do I feel upon this subject, that I would undertake to pronounce upon the plant cultivation of any establishment after seeing the collection of soils employed. Go to any common you like, and upon it, though it be of limited extent, you will find many qualities of soils, some remarkably strong, others very light, one part rich in vegetable matter, and another equally impoverished by an accumulation of sand, yet all may be sold for Epping or Wanstead soil, because it was brought from there; but the best quality is above all price, while the worst is worse than useless. Yet order from any common carter, and the chances are that you will throw your money away. It is just the same of peat or any other soil, it wants selecting by a person who knows good from bad, and then there is a chance of procuring something worth the trouble. But a short time back a neighbour of mine seeing I had some excellent Wimbledon peat, and that my hard-wooded plants seemed to like it, employed a carman to procure him two two-horse loads, and the result was two loads were delivered to him, and both would not have yielded ten bushels of soil suitable for pot plant cultivation. A short time back, I saw in the neighbourhood of London, a crate-load of peat which had been sent, as being suitable for Orchids, from Exeter, and I am quite sure one half of it was useless.

Now the proper course to pursue in procuring soils is to go to the place yourself, and taking a spade with you, examine in various parts till you meet with some of suitable quality, then send your carts and make a harvest of all the best of it, or at least as much as may be necessary for your purpose. Recollect it will not deteriorate by keeping, at least, until after the second year, and, peat, if kept dry, will remain good for a number of years. One of the best lots I ever had was procured from a part of Wimbledon Common, where, a few years back, the furze had been burnt, and consequently the upper surface was nicely charred. In this some of the best plants which have graced the Metropolitan exhibitions for some years past were grown, and I have reason to believe that Mr. Epps of Maidstone, one of the most successful Heath growers in the country, chars his peat slightly for the finer kinds of

Heaths. Peat, to be of the best quality, should not be more than two inches thick, firm in texture, and fibry, the upper surface covered with dwarf Heath, and the under surface resting on sand. This will generally be found in upland situations, but in the dry season after a continuance of fine weather, very excellent peat for storing away may be procured from comparatively lowland situations. Such, when it is brought home, should be carefully looked over, divesting the upper surface of all rough herbage, and the lower of every particle of sand that can be found upon it; then place it in ridges, two turves together in the form of the letter A, so that the air can always act upon all parts of it, and there let it remain, turning it occasionally until the rains of autumn render it necessary to stack it. If it is not wanted for use before the following summer, and in a well-regulated establishment it ought not to be wanted before that time, build some turf pits with it, which may be turned to good account, if for no other purpose than protecting Lettuce or Cauliflower plants, and the peat, by being exposed to the action of the weather on all sides, will be materially benefited thereby. Should it, however, not be necessary to build pits with it, stack it in narrow ridges four feet in height, the base being three feet wide, and tapering to a single turf at the top. In forming the stack, place the turves a short distance apart, so as to admit of the air percolating freely among them, and if it is stacked fresh from the common, it may be necessary—indeed, it is very desirable—to run an air drain longitudinally through the centre of the stack, so as to admit of a free circulation of air. Sometimes, instead of making an air drain, old pea stakes, or pieces of wood are introduced between each alternate layer of peat; indeed, it matters little how the air is admitted to the mass, so long as it has free intercommunication.

When peat is used fresh from the common, that is, without being prepared as before directed, it will be found an excellent plan to char the outer surface, which may be readily done over one of the sheet iron stoves placed on a little brick-work, recommended some years back by Mr. Rivers, or those who have burned their fingers with Polmaise experiments, may turn their old plates to good account in charring soils, and drying composts. If it is to be charred, the turves should be cut into pieces three inches wide, as then every part becomes equally heated, which is not the case if the turves are placed on the stove whole. Charring facilitates very materially the decomposition of the vegetable fibre, and it has another advantage, in destroying all seeds and insects in the mass.

Having said this much for peat, I may remark that loam may be prepared for immediate use in the same way, and, indeed, leaf mould, and composts of all kinds will be materially benefited, especially when intended for raising small seeds, if they are placed upon the stove until they are sufficiently heated to destroy the vegetative power of any seeds that they may contain.

While on the subject, I may state that charred cow-dung is an excellent manure for almost all purposes, and by charring it, it is fit for immediate use. The way to proceed is, to take some old wood, and build a cone some two or three feet high, then procure some green cow-dung, and cover the cone over nine inches thick, let it drain for a day or two, cover it with weeds or rubbish, and set fire to the wood, regulating the draught so as to prevent the fire burning too fiercely, and by the time the wood is consumed, you will have a fine crust of charred cow-dung, which is ready for immediate use; recollect, if the fire burns too fiercely, the dung will be consumed. To mix, when broken up, with composts, or to place a few pieces at the bottom of pots in which Calceolarias, Pelargoniums, or Cinerarias, or Pines or Vines are grown, this will be found a most excellent manure.

After soils are collected for use, it is important that they be not washed by excessive rains, and for that reason they should be in narrow, upright ridges, so as to make sure of the rain being thrown off, and after they have been turned a time or two, it may be necessary to protect them by a slight covering of weather boarding.

A.

Miscellaneous Notices.

The White Rust.—There are few natural groups of plants which have not their own peculiar parasite, which lives and decays, indeed, for years unheeded by the common observer, until some season peculiarly suited to its growth arrives, when it is too abundant or noxious to escape the most careless. In my own district (Bristol) nothing can have been more general, and in many cases pernicious, or even destructive, than the White Rust (*Uredo candida* of authors) which is so common on cruciferous plants. They have indeed several other parasitical enemies; but this is perhaps the most general, and extends its visitations either under the same or under very slightly different types to several other families of plants. Its geographical range is also most extensive, extending in the northern hemisphere from high latitudes as far as South Carolina, and it occurs in the Falkland Islands. In the spring of (1848), my attention was first turned to the peculiar structure of this parasite. So early as the end of March not a Cabbage or Colewort in my garden was free from the White Rust; and, as the season advanced, the young as well as the nearly mature plants became affected, presenting frequently a disagreeable leprous appearance, deranging their growth, and sometimes materially affecting their produce. At length, in the month of June, some of the plants exhibited the disease to an extraordinary degree, and became so strangely distorted, that on a cursory inspection it would have been difficult to say to what species a gathered specimen belonged. Every part of the flowers had become immensely enlarged; the leaves of the calyx and petals assumed a gigantic size, the latter retaining in some measure their proper yellow tint; the stamens too were distorted and the pistil projected beyond the now persistent blossom, and instead of being as usual narrow, was a quarter of an inch or more in width, and very much compressed on the sutural side, and on opening the young carpels, their inner surface, and in some cases even the placenta, was infested with the white spots of the rust. In some cases every flower and pod was affected, in others the mischief was confined to two or three upon a stalk, so as not to prevent entirely the production of seeds. Nothing indeed could well present a more singular appearance than the plant with its swollen and distorted leaves, its occasionally abortive panicles, of which nothing remained but rose-like tufts formed by the gouty stem leaves, and above all the powdery heads of buds, and the pendent fleshy flowers as large as those of *Albuca major*, and with somewhat of the same green and yellow aspect. I was greatly disappointed, on a minute comparison of the flowers and unripe seed-vessels with those in a normal condition, to find that there was no essential derangement of the fundamental structure, no metamorphosis properly so called, but simply an enlargement of all the parts, and a general looseness and hypertrophy in the cellular tissue, arising partly perhaps from the stimulating effect of the mycelium, and partly from the mere mechanical agency of its growth. The dissepiment alone was in proportion far narrower than usual, and extremely delicate, as though the placenta had been enlarged at its expense. There was nothing to throw any light on the true import of the parts of the carpels, the arrangement of the cellular structure being absolutely the same in both instances though infested everywhere with the mycelium. Wherever the mycelium did not penetrate, everything presented a perfectly natural appearance without any indication of disease; nor indeed is there any reason for supposing a diseased condition of the tissues preceded the growth of the fungus, which in that case would be [illegible] mere [illegible]-organization. Were the fungus in the first instance external, there might be some shadow of foundation for [illegible] an opinion, but the cuticle is perfectly closed till the mass of spores is burst through it, and the s[illegible] [illegible]oticed above, make their appearance in the closed cavities of the carpels, exactly as Botrytis i[illegible] [illegible]ans [illegible] observed [illegible] Payen and myself last autumn, in the fruit of the Tomato, where there was no immediate communication with the atmosphere. And the case is even stronger in some other fungi, especially in *Grandularia [illegible]* [illegible]y,) which had not been observed for many years, and had been quite misunderstood till its appearance [illegible] [illegible]ertain Munro's conservatory near Clifton last winter, and (as recorded by Professor [illegible]oues* in [illegible] [illegible] Apr[illegible] of the present year. In that curious production the spores are deeply [illegible]d, and th[illegible] [illegible], if burst at all, till, the whole parasite has been long perfectly developed.-- *Berkeley in Journal of [illegible]*

Horticultural Society, Sept. 3d.---But few plants were produced on this occasion, and those not of a very remarkable description. Of novelties, Mr. E. G. Henderson, of the Wellington Nursery, sent Achimenes longiflora alba, a pretty thing, but by no means in good character; Microsperma bartonioides, a Loasa-like annual, with pale yellow flowers, which are produced with considerable freedom; Beaufortia purpurea, a very dwarf growing species, with crimson purple flowers; Eriocnema æneum and marmoratum, two dwarf growing plants, remarkable for the beauty of their foliage; Æchmea fulgens, Vriesia speciosa, and Gesnera picta. From the same establishment we also noticed Tigridia canadensis, a free flowering kind, but as the flowers had faded, we could form no estimate of its value; some very beautiful cut Gladioli, and a fruit of the [illegible]pent Cucumber, Trichosanthes colubrina. A scarlet Geranium, a very free [illegible]ooming kind, w[illegible] [illegible]se-shoe foliage, called Beauty of the Parterre, was also sent from the same nursery; but we fear it is [illegible] much like Cerise Unique. Mr. Dobson, gardener to John Foster, Esq., sent four specimens of Achimenes—neat plants, but not of remarkable growth; and from the garden of the Society we noticed the following subjects:—Epidendrum alatum, a dingy looking thing, but most deliciously sweet, and E. cuspidatum; with these were Roscoea purpurea, Franciscea uniflora, a most useful plant; Aphelandra cristata, beautifully bloomed; Beaufortia splendens, Erica McNabiana, Ewereana, and eximia; and several species of Achimenes.

Of Fruit, the most remarkable was Mangoes, from Mr. Scott, gardener to Sir George Staunton, Bart.; and a dish of forced Late Admirable Peaches, of very superior growth. A monstrous Pine, said to be a species from Java, in which every pip produced a distinct fruit, was sent from Mrs. Steirs, of Teddington; it was a singular looking thing, of some six inches long, and two smaller fruit were produced from the base. Two large Melons were sent from Mr. Middlemiss, gardener to A. Pott, Esq., both of which had been attacked by a disease common among Melons this season, and said to be a kind of mildew or rust. One of them was remarkable as having been raised from seed nineteen years old. From the garden of the Society three kinds of Grapes were sent—one, the Olga, a new kind, said to possess medicinal qualities: it is a white kind, and certainly inferior to the White Muscadine; the other kinds were Chasselas Musque, beautifully ripened, and identical with Joslin's St. Albans, and a black kind, not quite ripe. Also a new Capsicum, said to be suitable for cutting up in salads, and resembling the kind known in the seed shops as the Bullock's Heart; and a new Savoy, a kind possessing, in our estimation, no merit at all, as at Leamington we recently saw the dwarf Drumhead, shown by cottagers, infinitely superior.

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RHYNCHOSPERMUM JASMINOIDES.

Nat. Order, APOCYNACEÆ.

GENERIC CHARACTER.—Rhynchospermum, *Alphonse De Candolle.*—*Calyx* deeply five-toothed, or five-parted; tube campanulate, with many glands at the base within, the glands truncate; lobes oblong. *Corolla* five-toothed, tube cylindraceous, without appendages, lobes obliquely obovate, convolute to the left in æstivation, and with the apices inflexed. *Stamens* five; *filaments* evidently adherent to the base of the corolla; *anthers* hastate, adherent to the middle of the stigma; inferior lobes destitute of pollen. *Nectary* cup-shaped, five-toothed; lobes obtuse. *Ovaries* two, longer than the nectary; *style* one; *stigma* oblong. *Follicles* elongated, compressed, narrow. *Seeds* numerous, obovate, compressed below, narrowed above into a slender neck, ending in a silky coma. (*D. C. Prodr.* Part 8.)

RHYNCHOSPERMUM JASMINOIDES, *Lindley.*—Jasmine-like Rhynchospermum.—Slender, climbing shrub; leaves elliptical, lanceolate, acute, glabrous; calyx deeply five-toothed; teeth subulate, acute, much shorter than the tube of the corolla, reflexed; corolla white, salver-shaped, and five-lobed; the tube much longer than the calyx, and suddenly contracted in the middle; the lobes half-spreading, obcuneate, twisted obliquely, about as long as the tube; nectary of five oblong, green, emarginate, hypogynous scales, sometimes slightly united at the edge. Flowers with a delicious scent.

SYNONYMY.—R. jasminoides, *Lindley, in Journ. Hort. Soc.*, i. 79.

DESCRIPTION.—A slender, climbing, evergreen shrub, rooting along its branches wherever it touches a damp surface, like Ivy. When wounded, its branches discharge a milky fluid. The young shoots are slightly downy; the leaves opposite, oval, deep green, quite smooth, sharp-pointed, with minute scale-like glands in the place of stipules. The flowers are white, deliciously sweet-scented, and produced in irregular corymbs on the ends of peduncles considerably longer than the leaves. The calyx consists of five narrow, smooth, convex sepals, rolled backwards, and much shorter than the tube of the corolla, with a very shallow, toothed, glandular ring surrounding the base of the latter. The corolla is about three-quarters of an inch long, pure white, salver-shaped, contracted in the middle of the tube, with a partially spreading border, the five divisions of which are wedge-shaped, truncate, and twisted obliquely. The anthers are five, arrow-headed, placed just within the orifice of the tube, and separated by five slightly elevated hairy lines. The ovary consists of two separate carpels, and is surrounded by five oblong, green, emarginate, hypogynous scales, which are sometimes slightly united at the edge.

The structure of this plant is not precisely that of the genus Rhynchospermum as given by M. Alphonse De Candolle, for the scales beneath the ovary are not exactly united into a cup. But they are partially so; and as there is no other difference, as far as can be ascertained, from the plant in a flowering condition, it may be referred to the genus. In habit it is more like an Aganosma, but its corolla has not the tapering lobes of that genus, nor do the nectary or stigma correspond with it.

HISTORY, &c.—Collected at Shanghai by Mr. Fortune, and first flowered in the Horticultural Society's Garden in 1845.—A. H.

There are in gardens two plants, probably distinct species, grown under this name; one, that represented in our plate, a charming greenhouse climber; the other, more trailing in its habit, which, as far as we are aware, has never flowered.

CULTURE.—Although not a very gay plant, this, from its delicious fragrance, is well worthy of extensive cultivation; and for mixing among other plants, if for its scent only, it is worthy of general care. When, however, it produces its spreading corymbose heads of white flowers in abundance, which it generally does, it is a very interesting plant; and once during the season it has been exhibited in the Royal Botanic Garden, in beautiful condition, by the Messrs. Fraser. It is readily propagated by cuttings of the half-ripened wood, the cuttings being put in sand, and the pot plunged in a slight hot-bed under the protection of a bell-glass. When the cuttings are rooted, pot them off singly using a light and tolerably rich compost; place them again in a close frame until they are established, after which they may be kept in a warm part of the greenhouse. The Rhynchospermum is a free-growing plant, succeeding perfectly in the greenhouse; but when rapid growth is required, and large plants in a short time, the cool end of the plant-stove, or an intermediate house, will be found more suitable, especially during the growing season. As the plants progress in growth, they may receive liberal shifts, and when in full luxuriance, a little weak liquid manure may be given to them with advantage. During the winter season the plants must be kept comparatively dry; and at all seasons special care must be taken to have the pots properly drained. Train to neat trellises as the plants progress in growth, and stop the strong shoots occasionally to equalise the distribution of the sap, and consequently the growth. For covering trellises in the conservatory or greenhouse, when planted out, this will be found a very useful plant; and the only precaution necessary at the time of planting is to give plenty of drainage. All who like the Pergularia odoratissima will like this plant: it is to the greenhouse and conservatory what the Pergularia is to the plant-stove.—A.

Miscellaneous Notice.

Caprification.—The Academy of Naples has received various Memoirs in reply to the programme it put forth on the subject of Caprification. Some of the facts stated in these Memoirs have been summed up in Professor Link's Report on Physiological Botany, as published in the *Ray Reports*; from which source the following facts are gleaned:—Mem. No. 1 denies the influence of caprification in fertilization: female flowers are always found in the flowers, but no males; and the impregnation of the Figs remains a mystery. The author does not recommend caprification. Mem. No. 3 arrives at the following conclusions:—1. The wild Fig is not the male of the cultivated Fig, as it has been considered. 2. Inasmuch as the structure of the flower and the seeds, in the varieties of the cultivated Fig, are exactly the same, there appears no reason why caprification should be requisite in some varieties and not in others. 3. The insect does not hasten the ripening, neither does it contribute to the setting of the fruit, any more than it does to its impregnation. 4. The falling off of the fruit of the wild Fig, which contains no larvæ, proves nothing; for when many fruits have set upon the tree, they still fall off, even when larvæ are present. 5. The cause of the falling off must be sought in other circumstances—in the climate, changes of the weather, &c. 6. Caprification is perfectly useless, either for ripening or setting the fruits. Mem. No. 5 contains the conclusion: that the action of the cynips upon the cultivated Fig is entirely mechanical, and merely serves, like any other irritant, to accellerate somewhat the ripening of the fruit. Hence, when this is not requisite, caprification is perfectly useless, nay, even injurious to the perfect maturation of the fruit. Mem. No. 6 considers caprification requisite, but only in the case of abortive Figs. One Mem. only considers it necessary for fructification. In my early days I had an opportunity of observing caprification in Portugal, and I have stated, that it exerts no influence upon impregnation. However, many varieties become larger and more beautiful when they are pierced by this minute cynips.

FRENCH DAISY CHRYSANTHEMUMS.*

By M. HERINCQ.

THE Indian Chrysanthemum is one of the most beautiful flowers of autumn. People were accustomed to admire them delineated on the China porcelain, and in their ignorance of the marvels of the Celestial empire, to qualify them as ideal flowers. An irresistible *penchânt* leads the admiration of the Chinese to this plant. With it they decorate their houses, and their tables on the *fête* days, while it is painted on all their porcelain vases. In this country the merits of the Chrysanthemum are already appreciated, and for some years it has acquired considerable repute, which is chiefly owing to the facility with which it doubles its capitules, and modifies the colours of its flowers. At the present day a great number of varieties are in cultivation, some of them with flowers dark purple, nearly black, rose, white, orange, yellow; sometimes we find a single capitule or head with two different colours; other varieties are distinguished by the form of their flowers, which constitute rayed capitules, partly or entirely ligulate; and partly or entirely tubular.

Horticulture has been latterly enriched with a new species, which is perhaps only a simple type of the old form; this is known in the trade under the name of Chrysanthemum matricarioides, and very often under the less pretending title of *Chusan daisy*. This new type, sent from China by Mr. Fortune, in 1846, has already produced numerous charming miniature varieties, having nevertheless the most perfect and elegant forms.

The *Pompon de Chine*, as they are sometimes called, by their dwarf habit, their handsome form, their dense foliage, and their elegant small capitules of flowers of the most striking colours, are well fitted to occupy a void in the decoration, not only of our gardens and greenhouses, but even of the flower-stands and baskets of our parlours and drawing-rooms. Of those which have been lately added to our collections the following are particularly deserving of notice:—

Bernetianum.—The colour of an Amaranth on a white ground.

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* From the *Revue Horticole*,

Circé.—Rosy violet, streaked and painted with white.
Bouton de Venus.—Capitule small and neat, double, of a delicate rose colour.
La Fiancée.—Very pure white.
Piquillo.—Of bright crimson.
Elise Meillez.—Rosy purple, tipped with white.
Pactole.—Amber yellow, very pretty.
Pâquerette.—Capitule small, rayed with rose, disk yellow, tubular.

These eight novel varieties have been obtained by M. Lebois. M. Pelé, a distinguished horticulturist of Paris, has also obtained many varieties, the most interesting of which is called ***Madame Pépin***, and which flowers constantly about a month before the others. It is probable that this new type will furnish other varieties as early, which will impart a novel and important quality to Chrysanthemums. The other varieties of M. Pelé are the following:—

Abbe Grieux.—Capitule medium size, with ligules carminated below.
Adele Couvelet.—Capitule of medium size, of a lilac colour; white at the centre.
Antonia.—Capitule large, rose; centre orange.
Astrée brilliant.—Capitule large, bright yellow, mixed with salmon.
Astrée.—Capitule of medium size, yellow and red.
Domage.—Capitule of medium size, purplish.
Docteur Mercier.—Capitule very large, brilliant yellow.
Duchesse de Grammont.—Capitule of medium size, of a rose colour, tinged with claret.
Gama.—Capitule large, red and yellow, mixed with carmine.
Leverrier.—Capitule of medium size, salmon yellow.
Mademoiselle Duby.—Capitule small, with lilac ligules.
Madame Guillaume.—Capitule medium size, violet; centre white.
Mount Etna.—Capitule medium size, lively carmine.
Paganini.—Capitule medium size, ligules rosy white above, carmine below.
Pulcherie.—Capitule of medium size, white, slightly tipped with lilac.
Rattier.—Capitule large, bright red.
Tullie.—Capitule medium size, white, tipped with rose.
Vicomtesse de Belleval.—Capitule large, white above, carmine below.

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ON THE CULTURE OF LISIANTHUS RUSSELLIANUS.

BY MR. JOHN GREEN, C.M.H.S. GARDENER TO SIR EDMUND ANTROBUS, BART.

THE following remarks on this splendid plant were written a few years back, and communicated to the Horticultural Society. I have seen no reason to alter my practice since, and therefore the result of it is quite at your service, and I hope your engraving of the plant shown at Chiswick may induce many more to undertake the cultivation of so useful an autumn plant.

This beautiful and much-esteemed plant was introduced into this country, in 1835, from Mexico. Being found to be capable of producing ripe seed in abundance, a large stock of plants was soon diffused among our best cultivators, who hailed it with delight. Nevertheless, strange to say, its successful cultivation, except in a few instances, still remains a desideratum—a fact amply proved by the paucity of really well-cultivated plants produced at our great metropolitan exhibitions.

Having been somewhat more successful than some of my neighbours in growing and flowering this plant, truly magnificent when well managed, I will give my plan, which is as follows:—I sow early in spring; I first fill a six-inch pot half full of potsherds, over which I place one inch of sphagnum moss; I then fill the pot within one inch of the top with rich light sandy soil. When all is pressed down equal and firm, and a smooth surface made with the bottom of a small pot, I sow the seed, and cover it very slightly with dry white sand. I cover the pots with bell-glasses, and place them on a shelf in a shady part of an early vinery, keeping the surface constantly moist by pouring water on the outside of the glasses. As soon as the plants have come up, air is admitted, and increased as they advance in growth. When sufficiently strong they are pricked out into small pots, having the same drainage, moss, and mixture as the seed-pots, and are again shaded with hand or bell glasses until the plants become established. In three weeks or a month they require to be potted off singly into small pots; and I encourage their growth as much as possible by placing them in a shady part of either a Vinery or Melon-pit, whichever is kept at the highest temperature, with a humid atmosphere. As soon as they begin to fill their pots with roots, I give them once a-week a little clarified manure water.

I repot into winter pots about the middle of August, using pots to suit the size of the plants, and replacing them in the same growing temperature as before, till their pots are filled with roots. After this I begin to prepare them for winter by giving them less moisture, more air, and a cooler temperature; and finally they are placed on a shelf near the glass, in the coolest part of the stove, and wintered rather dry. Early in February I begin to increase the heat and moisture; and as soon as they begin to grow freely, I repot them, which is generally about the second week in March. They receive another shift in April, and those that are intended for large specimens a third in May (using 18 or 20 inch pots), and a mixture consisting of equal quantities of good strong maiden loam, peat, or bog mould, burnt clay, leaf mould, and cow manure, with a little white sand. These materials are well mixed together, and if dry are moistened to prevent their running too close in the pots. In potting I use a large quantity of drainage, and plenty of rubble stones, small potsherds, and coarse river sand amongst the mixture. I make the mixture just firm, but am very careful to leave it quite porous. I give very little water till the roots reach the sides of the pots: it is increased as the plants and the season advance, giving heat and moisture in proportion. Too much stress cannot be put upon making a proper mechanical arrangement of rich, porous, and well-drained soils, which are essential for the healthy developement of plants of the nature of the Lisianthus.

LISIANTHUS RUSSELLIANUS, as exhibited at Chiswick.

When the young shoots have become sufficiently advanced, I stop them immediately above the second joint; each shoot will then produce four; they require stopping about three times. The last stopping for plants required to bloom early should take place in the first week in June, and for plants required to bloom later, in the first week in July. As they advance in growth the branches will require to be tied out with sticks, to make round and well-formed plants.

When the plants are growing freely, they are sometimes attacked with a disease at the base, which is produced by the moist and confined atmosphere that is required for their fine growth. To prevent this I allow the surface to become quite dry once a-week, during which the plants are supplied with moisture from feeders or pans in which the pots are placed for a few hours, being careful not to allow any stagnant water to remain about them. As soon as the blooms begin to expand, I keep a drier atmosphere, and expose them to more air and light, which much improves their colour.

As to the result of the above practice, I may mention, in conclusion that I grew some seedling plants in 1844, one of which I exhibited at the Horticultural Society's Garden in July, 1845, which was awarded a silver Knightian medal, accompanied with this note by the judges:—"Had this been exhibited in its proper place, it would have received a higher medal." In July, 1846, a second plant received a large silver medal; and to a third the same award was made in July, 1847. Another plant was also shown in the same year at the Royal Botanic Society's Garden, Regent's Park, and was awarded the first prize as a single specimen of superior cultivation. The plant that I exhibited at the Horticultural Society in July, 1847, had five hundred blooms expanded at once, ten days after the exhibition.

ON RAISING AND EXHIBITING THE HOLLYHOCK.

By Mr. G. GLENNY, F.H.S.

THIS noble, but until lately coarse, flower has been so improved within the last few years, that the better kind of gardens possess it in all its varied forms and colours that are worth cultivating, and it is rapidly making its way into most florists' establishments. It is much improved in the denseness of its colours, since it has become practicable to produce the plant with other good properties, but no one point has done so much for it as thickness of petal.

The properties of the Hollyhock have been fully explained in the volume of "Properties of Flowers;" and we can hardly describe improvements without referring to the points that are desirable. The characteristic of the Hollyhock for many years was coarseness—that is, roughness and informality in the flower, and flimsiness of petal, which was scarcely thicker in any of the numerous varieties, than that of the field Poppy. This flimsiness was against dense colours, because we could almost see through the petals, and therefore lost the brilliance of even the brighter colours. The great variety of colours induced many to look most to colour; doubleness of flower was, however, indispensable, for the single were excessively mean and weedy in appearance. Many nurseries, however, were stocked with large collections, and could supply fifty or sixty very distinct colours; forms were not considered. The first attempt to improve the flower systematically was made in Essex, and in a few years somewhere about thirty varieties were raised with evident approaches to the standard laid down in "Properties of Flowers and Plants." They had thicker petals, the centre was less confused, the colours quite new, many were mottled and spotted, and the whole formed an interesting collection.

The Hollyhock may be raised from seed for new varieties, but when a new and good sort is procured it should be propagated from portions of the stem or root. The seedlings rarely bring more than one in fifty so good as that which yielded the seed; but if there is one of a thousand as good as the best, and therefore worthy of a name and propagation, it will repay us for our trouble.

For the seedling bed prepare a piece of ground four feet wide, with an alley on each side, and, if the soil be good, deep-trench it two spits, and throw the bottom earth to the top, and the top spit to the bottom or undermost. It is not necessary to dung the ground if there is any strength at all in it, for if it will grow a Cabbage, it is sufficient. Let the lumps in this be well broken, and rake the surface smooth; sow the seed in March, as thinly as you can, so that no two seeds are nearer to each other than an inch; rake them in well, or, what is better, sift some dry soil over the seeds so as to cover them. When these come up, and begin growing, the weeds will come and must be kept under, for weeds on a seedling bed are the greatest drawback to the progress of the plants; constantly weeding, therefore, as fast as any weeds appear, is a matter of course. In the month of June the plants will have advanced sufficiently to plant in nursery beds six inches apart every way. The beds four feet wide, and any required length, with an alley on each side to walk and work on. The nursery bed should be prepared the same as the seed bed, and when all the plants are removed from the seed bed, it may be filled again with them at six inches apart every way. Water in dry weather; but they must especially be well moistened when planted out first. In taking the young plants from the seed bed, they must be raised up with a fork, or the dibble, or trowel, for the roots would break if you attempted to draw them; and, if the weather has been long dry, it may be desirable to soak the ground well before you attempt to take them up. They may be planted with the dibble, by making holes deep enough to take in the roots unbent, and closing the hole by making another close to the side, and pushing the earth in afterwards, and pressing the sides of the first hole in upon the roots. The beds must be kept clear of weeds as before, and the things left to grow with nothing further than occasional watering. By the autumn of the year they will be strong plants, and they may be put out wherever you intend them to bloom, whether in the borders, or in rows at any part of the garden, or even where they are; but every other plant must be taken up, as well as every other row, so that they will be left one foot apart all over the bed; they may be supported by a strong line along a few upright stakes, so that they may, as they advance in the spring, be fastened to the line in case of boisterous weather.

As they bloom you must remove every single flower, and every semi-double one, unless there be anything remarkably worth saving in the character or colour; generally discard everything that is not new and good. Save not a single plant which has a thin petal; they are all useless. Take no heed of old colours, unless the flower is better than we have, and new colours ought to be on thick petals to justify saving them. You will find that, of a good many plants, very few will be worth propagating, and those which are should be labelled, described, and supported by stakes, for the sake of their seed. The seed pods should be removed as soon as they are brown, and before they begin to scatter about, as much depends on every advance among seeds; as soon as you have gathered the seed, cut down the stem to within three inches of the ground, stir the earth round with a fork, not deep enough to hurt their fibres, but to let the air in. In discarding the worthless varieties the instant they bloom, you prevent the seed of the good ones from being contaminated.

Late in the autumn you will observe how many heads the plants have, and you may dig them up, and part them accordingly; replacing them in the ground, giving them a foot apart, and labelling them with a number referring to the number in your book, and under which you describe them, with all their peculiarities, and particularly that for which you selected them and saved them. It is practicable to increase some Hollyhocks by eyes—that is, by taking the stem off and cutting an inch of it with the leaf on, and planting them on heat as you would the eyes of a vine, and thus producing young plants; but none are so good and so strong as those produced by parting the roots. When, therefore, you have decided on propagating a plant which has bloomed, you may greatly promote the spreading of the roots to several heads, by forking the ground up round it and giving plenty of dung, cutting down the stem to within six inches of the ground. This will promote rapid growth and spreading into separate heads; at the end of the season, say October or November, dig them up, part them into as may pieces of roots as there are eyes, or rather hearts, to grow, and plant them out in rich ground eighteen inches apart; if in rows, or in places where they ought to bloom, they may require watering in dry weather for a time until they have firm roots again, and begin to make fresh growth; but they will not do much beyond keeping alive until the spring months return, when they will grow fast. This second year will prove whether the flower, generally speaking, is worth being placed among the better sorts, or fails to maintain the character which procured for the plant the distinction of being labelled and propagated.

The Hollyhock is clearly becoming adopted everywhere as a favourite; and it may deserve it, if florists' will be careful to throw away enough, and not keep second-rate sorts, for the purpose of saying they raised such, for it is no credit to have raised a second-rate variety; and we would much rather see a man destroy a whole collection than risk spoiling good seed for the sake of a second-class plant. If there is any lack of a good bold centre, well filled with florets, discard them. If the petals are thin, throw the plants away; you are better without colour than without form, and thin petals cannot retain any form. If the flowers be not close on the stem they are useless; the bloom should form one solid pyramid, as it were, the flowers touching one another, spreading out rather wide, for the larger the base and the smaller the point the better. Whether the stem be three or six feet high, the flowers should be much further from the stalk at bottom than they are at top—in fact, gradually taper towards the upper point, which will be unbloomed buds, and close as they can be to the stem. As you may have a knife without having a spade, you may make a rule of cutting down all the stems of those that are inferior the instant a single flower opens, and they can be dug up at a future period; by moving the flower at once, you prevent the spread of its fertilizing dust, and the few good ones that remain will have every chance of producing you even better things than themselves, whereas, if they were to be left, there would be far greater numbers worse than there would be equal to even the worst of the plants sowed from. The Hollyhock is a noble plant to place within shrubberies, or at the backs of broad borders, or in a line a few feet from the edge of a path, and it cannot be too much cultivated as a garden flower, whatever might be said of it as a show flower.

There has been much difference of opinion as to the propriety of making the Hollyhock a florists' flower, because of the difficulty of making arrangements for its exhibition. The whole spike is too much, a single bloom is too little. The properties being on the plant and spike, and not in the individual flowers alone, it is possible that one of the finest individual flowers may be on the very worst plant. Many there are which have their flowers very good, but so wide apart, that the spike is frightful; others, which are somewhat inferior in the flower, have a splendid spike. It has been, therefore, decided, that a piece of the stem with five flowers to it should be exhibited; this will give the form of the spike almost, and entirely exhibit the beauty of the individual flowers; but there ought not to be prizes at all for those who show collections of single flowers. Let all the spike be shown, when somebody will tell us how to prevent its flagging. However, the effect of a part of the stem with five perfect flowers to it is very good. It is showy enough to help an exhibition greatly, but it must be strictly limited as to number, and all must show alike. The stands may now be as diversified as those of Dahlias; there are already hundreds of shades, colours, and mixtures—though we never care to see more than about thirty of them; the rest are good for nothing but throwing away. The most successful grower and improver was the late Mr. Baron, of Saffron Waldon. His set was purchased early by Bircham, of Headingham Bungay, who follows up the raising of new varieties with spirit, and who, we presume, will occasionally inform us as he gets ready to send out anything very new and very good. But Mr. Baron's death greatly interrupted the progress of this flower, for he had the fair start of everybody, as Mr. Hoyle, and Mr. Beck have for Geraniums.

The preparation for exhibition is simple enough: select plants that are half bloomed—that is, whose lower half of blooms are fully developed, cut the stem off low down, turn the stem round and see which are the best flowers, and mind that there be five blooms; when you have made up your mind as to which portion of stem will exhibit best, cut away the flowers above and below, and cut the stem the right length to have the lower flowers even with, although not resting on, the board or stand, or in the bottles, or vases, or whatever else they are shown in. A flat board, like a Dahlia stand, with the holes wide enough apart to do justice to the portion of spike shown, would do very well, but they would require large tubes and holes a foot apart. The best way to exhibit would be in flat boxes of moss with bottles or jars to hold water, so that the stem would go in the bottle or jar and rest on the bottom, and that the lower flowers should just be kept up from resting their edges on the moss, and with room enough to show to advantage without touching each other, the largest and tallest being at the back, those a little smaller being in the middle, and the smallest in front. The colours should be diversified and yet uniform, bright flowers at the corners, duller in the middle, but all as nearly uniform, as to light and dark, as possible, for it is much owing to this that many a collection of flowers looks superior to others not so carefully nor so uniformly displayed. The absence of any set rules for showing the Hollyhock, has alone prevented many societies from adopting it as an article for show. The stems are too large for any tubes made for Dahlias, and no real good will be done until it is decided what stands shall be used in showing. They ought to be a foot apart. Twelve specimens are enough in all cases, to exhibit, even for dealers, unless they wish a display without competition, when they may do what they please.

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New and Rare Plants.

TRICHOPILIA SUAVIS, *Lindley*. Sweet Trichopil (*Paxt. Fl. Gard.*, i., t. 11).—Nat. Ord., Orchidaceæ, § Vandeæ-Brassideæ.—A very handsome stove epiphyte, with thin oblong pseudo-bulbs, each bearing one broad, oblong, wavy, leathery leaf, which grows from four to six inches high. The flower stems issue from the base of the pseudo-bulbs, and each bear two or three blossoms, which consist of linear nearly straight sepals and petals, white slightly stained with red, and a great convolute lip, cream coloured in the throat, and richly spotted with rose colour on the broad, wavy margin; the flowers are full five inches in diameter, and emit the most delicate odour of Hawthorn. From Central America. Introduced in 1848. Flowers in summer.

CUPHEA PURPUREA, *Lemaire*. Purple-flowered Cuphea (*Flore des Serres*, t. 412).—Nat. Ord., Lythraceæ, § Lythreæ.—A very pretty hybrid perennial sub-shrubby plant, which seems to be suitable for bedding-out. It has the habit and foliage of *C. miniata*. The flowers are large, handsome, of a fine bright rose colour, slightly shaded with violet; they have four small petals, and two large ones. A Belgian garden hybrid, obtained by M. Delache of St. Omer, between *C. miniata* and *C. viscosissima*, the former being the seed-bearing parent. Raised about 1848. Flowers during summer.

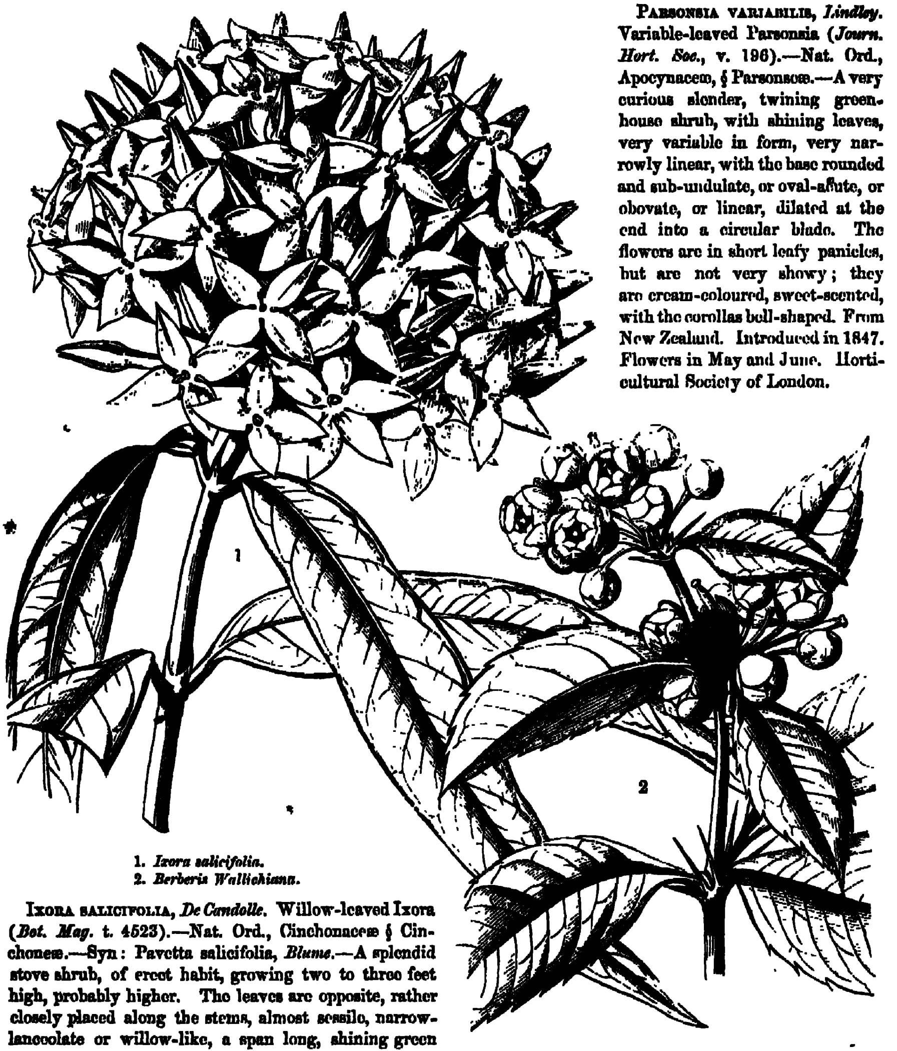
MEDINILLA MAGNIFICA, *Lindley*. Magnificent Medinilla (*Paxt. Fl. Gard.*, *I.*, t. 12).—Nat. Ord. Melastomaceæ, § Melastomeæ.—Syn. Medinilla bracteata, *of gardens*, not of *Blume*.—A noble erect evergreen shrubby stove-plant, with compressed four-winged branches, setose at the nodes. The leaves are very large—nearly a foot long—and somewhat coarse-looking, unless the plant is of a large size; they are opposite, obovate-oblong, cordate, somewhat stem-clasping, leathery and deep green. The flowers are in terminal pendulous panicles, fifteen to eighteen inches long, furnished with whorled branches, and many very large deciduous many-nerved rose-pink reflexed bracts, growing in whorls of four. The flowers are deep glossy rose colour, deeper in the bud, and are decandrous. From Java. Introduced in 1848. Flowers in April and May. Messrs. Veitch, of Exeter.

HOYA CORIACEA, *Blume*. Leathery-leaved Hoya (*Bot. Mag.*, t. 4518).—Nat Ord., Asclepiadaceæ, § Stapeliæ.—A smooth stove shrub, with terete twining stems, bearing opposite elliptic, somewhat coriaceous costate penni-nerved leaves on short thick petioles. The umbels of flowers are borne on long, pendent peduncles, from the axils of the leaves; the blossoms are rather pretty, the corolla being large, glabrous, and glossy externally, downy within, with triangular acute lobes of a pale tawny colour, the staminal crown of white ovate leaflets, with a dark brown eye. From Java: mountain woods in the west. Introduced about 1848. Flowers in August. Messrs. Veitch, of Exeter.

PARSONSIA HETEROPHYLLA, *A. Cunningham*. Various-leaved Parsonsia (*Journ. Hort. Soc.* v. 194).—Nat Ord., Apocynaceæ, § Parsonseæ.—Syn: P. albiflora, *Raoul*.—A very curious slender, twining, hardy greenhouse shrub, with persistent leaves, leathery, dull green, often brown, "linear lanceolate, ovate lanceolate, obovate, or even spathulate, often repand, varying in length from two to four inches." The flowers grow in close, one-sided, naked panicles, and are pale cream-colour, rather sweet scented; the corollas urceolate, with a revolute, five-lobed border. From New Zealand: northern island. Introduced in 1847. Flowers in May and June. Horticultural Society of London.

HOYA ATROPURPUREA, *Hooker*. Brown purple flowered Hoya (*Bot. Mag.* t. 4520).—Nat. Ord., Arclepiadaceæ, § Stapeliæ.—A smooth stove shrub, with terete twining stems, bearing opposite, ovate, acute, thick, fleshy, five-nerved leaves, on very thick petioles. The flowers grow in a dense umbel, on short axillary peduncles, and are of a rich purplish-brown colour; the corolla is divided into five roundish acuminated hairy-pubescent lobes, of an ashy brown, with the rich purple-brown staminal crown of ovate fleshy leaflets standing in the centre. From Java · woods of Panarang. Introduced about 1848. Flowers in autumn. Messrs. Veitch, of Exeter.

Parsonsia variabilis, *Lindley*. Variable-leaved Parsonsia (*Journ. Hort. Soc.*, v. 196).—Nat. Ord., Apocynaceæ, § Parsonseæ.—A very curious slender, twining greenhouse shrub, with shining leaves, very variable in form, very narrowly linear, with the base rounded and sub-undulate, or oval-acute, or obovate, or linear, dilated at the end into a circular blade. The flowers are in short leafy panicles, but are not very showy; they are cream-coloured, sweet-scented, with the corollas bell-shaped. From New Zealand. Introduced in 1847. Flowers in May and June. Horticultural Society of London.



1. *Ixora salicifolia.*
2. *Berberis Wallichiana.*

Ixora salicifolia, *De Candolle*. Willow-leaved Ixora (*Bot. Mag.* t. 4523).—Nat. Ord., Cinchonaceæ § Cinchoneæ.—Syn: Pavetta salicifolia, *Blume*.—A splendid stove shrub, of erect habit, growing two to three feet high, probably higher. The leaves are opposite, rather closely placed along the stems, almost sessile, narrow-lanceolate or willow-like, a span long, shining green above. The flowers grow in large terminal corymbs, forming hemispherical heads, and are deep orange red or flame-coloured (in a variety with somewhat smaller blossoms, almost crimson); they are upwards of an inch in diameter, and consist of a long slender almost filiform tube, and a spreading limb of four lanceolate ovate acute lobes. From Java: Mount Seribu. Introduced by Mr. T. Lobb about 1848. Flowers in summer. Messrs. Veitch of Exeter.

Berberis Wallichiana, *De Candolle.* Wallich's Berberry (*Paxt. Fl. Gard.* i., 79).—Nat. Ord., Berberaceæ § Berbereæ.—Syn: B. macrophylla *of gardens*; B. atrovirens, *G. Don*.—A very ornamental half-hardy, perhaps hardy evergreen shrub, growing ten feet high, and furnished with dark green dense elliptic sharp-pointed serrated leaves, growing in clusters, the branches also bearing slender three-parted spines. The flowers are clustered in the axils of the leaves on short stalks, and are large, and of a deep yellow colour, giving the plant a very ornamental aspect. From Java: mountains, 9000 feet elevation. Introduced in 1845, by Mr. T. Lobb. Flowers in summer. Messrs. Veitch of Exeter. It has stood three winters at Exeter, without shelter.

AËRIDES MACULOSUM, VAR. SCHRŒDERI.

Nat. Ord., ORCHIDACEÆ § VANDEÆ.

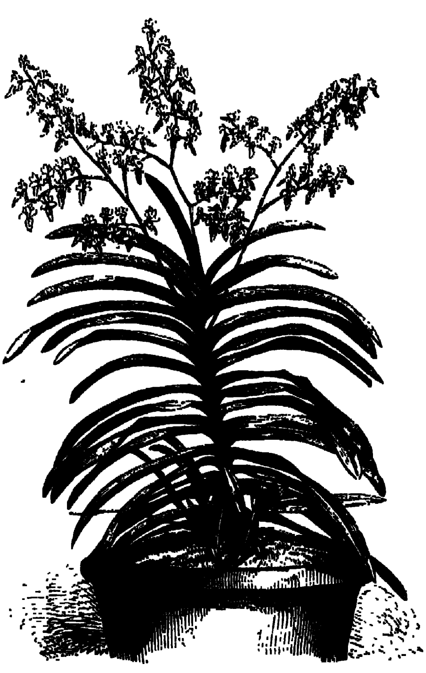
GENERIC CHARACTER.—Aërides, *Loureiro.*—*Perianth* patent or closed, the segments nearly equal; the *exterior* lateral, often oblique at the base, connate with the produced base of the column; *interior* somewhat oblique, adherent to the base of the column. *Labellum* articulated with the base of the column, saccate or spurred, three-lobed, the lateral lobes dwarfed, the limb hood-like or subulate, sometimes short and tumid, or subfornicate. *Column* reclining on the ovary, short, not winged. *Anthers* two-celled. *Pollen masses* two, sulcate behind. *Caudicles* broad or filiform. *Gland* peltate or sub-rotund.—Indian herbs, epiphytes, caulescent, almost simple, rooting; leaves two-ranked, coriaceous, or half fleshy; flowers in racemes or spikes. (*Endlicher, Gen. Plant*, 1493.)

AËRIDES MACULOSUM, *Lindley.*—Leaves distichous, channelled, very broad and thick, obsoletely notched, obtuse and very obliquely truncated, spotted with brown at the edge of the under surface near the base, very densely set; flowers fragrant, rose-coloured, spotted with purple; sepals ovate-oblong, somewhat recurved at the margin, spotted; petals rather smaller, less fleshy, more acute and oblique, and more numerously spotted; lip large, ovate, lateral lobes very small, falcate, with a simple tubercle between them, intermediate one very much larger, long, deflexed at the margins, undulated, deeper coloured; spur curved beneath.

Var. Schrœderi.—Schröder's Air-plant. Labellum narrower; lateral teeth small, incurved, with a bifid tubercle between them. Flowers much paler than in the type, whitish tinged with lilac and spotted with rose.

DESCRIPTION.—An epiphytal herb with broadly strap-shaped, obtuse, and deeply emarginate oblique leaves, and a pendent, open, many-flowered panicle. Flowers very delicate, the sepals and lateral petals almost alike, obovate and obtuse, spreading, white tinged with lilac, and spotted with lilac-rose. Labellum consisting of a pouch-like base, prolonged downwards into a slender arched spur, bordered above by a small tooth on each side, between which is a bifid tubercle; the middle lobe of the lip is, at first, suddenly expanded, then contracting from an angle on each side to a somewhat obtuse point, forming, thus, a narrow triangular-rhomboid limb, with the sides deflexed; the middle lobe pale lilac marked with rose, deepest at the base; the spur gradually shaded into bright yellowish green.

HISTORY, &c.—This plant seems to bear a close resemblance to A. maculosum, from which it can hardly be specifically distinct, although in the shape of the lateral teeth of the lip, and in the bifid tubercle between them, it appears to differ slightly. Considering the much greater differences between the other species we prefer to regard this as a variety.—A. H.



AERIDES MACULOSUM, VAR. SCHRŒDERI.

For an opportunity of figuring this very beautiful plant, we are indebted to J. H. Schröder, Esq., of Stratford Green, Essex, in whose unique collection of Orchids it has blossomed several times, and by whom the following particulars are supplied:—"I purchased it about six years back at Mr. Steven's sale, Covent Garden, being part of a small importation from the Hills near Bombay. My attention was directed to it by its very distinct habit, and the remains of a flower spike from every leaf. We have flowered it now for three years, and each year finer than the preceding, and should we be fortunate enough to attain its native flowering habit, I need not say what a magnificent thing it will be. It appears to be a hybrid between Aërides crispum and maculosum, and on that account I value it the more, as I do not think it is so likely to be introduced again."

CULTURE.—The following is the treatment recommended by Mr. Goode:—The plants belonging to this lovely genus, to grow them to perfection, require to be placed, in the growing season, in the warmest and most humid part of the Orchid-house; and, in addition to the moisture suspended in the atmosphere, to be liberally syringed daily with tepid soft water. When, however, the plants are first imported, they must be thoroughly washed, both root, branch, and foliage, for until they are cleared of all kinds of filth it will be found impossible to grow them to anything like perfection. Rustic baskets, or pots with perforated sides, are the most suitable to grow them in, and the compost used should be very fibrous peat and sphagnum moss, liberally intermixed with charcoal in large and small pieces: press the compost close together, and to make sure that the plants are firm in the pots, use a few pegs to hold the soil together. Suspend the pot or basket close to the glass and take care to keep a moist atmosphere at all times, and the plants when once established will then grow with great freedom. Water liberally, and shade in very sunny weather, and take care that the plants are not broiled by a too free admission of air in immediate contact with them. When the growth is completed, and more especially after they begin to show bloom, they may be kept comparatively dry, but they must not at any time be subjected to a low temperature.—A.

Vegetable Physiology.

By ARTHUR HENFREY, Esq., F.L.S., Lecturer on Botany at St. George's Hospital.

THE ELEMENTARY STRUCTURE OF PLANTS.

IN our last chapter, we examined the microscopic components of which plants, generally, are built up, and the reader will now be prepared for a more particular account of the manner in which the different forms of elementary organs occur in different plants; but, as it is not intended to enter, in these papers, into a minute account of the anatomy of the different parts of a vegetable, and since, in the descriptions of roots, stems, leaves, &c., I shall dwell upon their elementary construction so far as is necessary for the explanation of the causes of the facts observed, or the practical operations carried on in horticulture on such parts, I shall here merely preface those more special observations, by a brief summary of the general mode of distribution of the elementary tissues.

It has been said already, that all vegetable structure consists, at its first production, of membranous cells filled with nutrient juices, and that these cells undergo various changes of form and consistence, according to the part of the perfect plant in which they are situated, and as plants differ so much in habit and conformation, according to the kind of plant which they contribute to form. Moreover, every plant, from the microscopic Alga, to the loftiest forest tree, is at its birth a single, simple, membranous cell, and while the former remains in the same condition throughout its brief existence, the latter gains its majestic proportions by the process of self-multiplication of cells, all descended by generations, continuing an unbroken line through centuries, from that one original, mysteriously endowed, germ-cell.

Taking a general view of the Vegetable Kingdom, we find that the nature of the changes which the original cellular tissue undergoes, before the plant arrives at maturity, is a tolerably good characteristic on which to found comparisons as to rank in the scale of vegetation for the purposes of classification; in other words, the elementary structure of plants, as might be expected, bears a relation to the complexity of external form, and the variety of the functions exercised within the individual plant. It may not be uninteresting, therefore, to trace briefly the various links of the chain of organization, proceeding from the lowest up to the highest forms, premising, however, that the descriptions of the tribes are not those of individual members of a series, but merely sketches of the general characters of groups, which, each taken as a whole, may be regarded as inferior or superior to one another; for, in no department of organized nature is there less ground for assuming the existence of a single direct graduated series of species, than in the vegetable kingdom.

The lowest tribes of plants are wholly composed of simple cellular tissue. whence they are distinguished by some authors by the name of the Cellular plants; they comprehend the Algæ, or family of the Sea-weeds, with their fresh-water allies; the Fungi, or Mushroom and Mildew tribe; and the Lichens. These plants, although differing among themselves to a great extent in consistence and texture, are all distinguished from the higher tribes by the absence of anything like spiral structures in their elementary organs, and, indeed, of anything like true woody, or fibrous tissues.

The simplest Alga is a single membranous cell, those a little more advanced are mere strings of cells joined end to end, and where they attain great size, and a firm and resisting substance, we find this to be composed solely of cells, the increased size being given by great multiplication of number, without much difference of form, and the greater firmness resulting from a closer packing of the component cells and a thickening of their walls by deposits, here usually of a tough, jelly-like, or horny consistence, produced in the same way as the harder secondary deposits of wood-cells. In the Fungi, the cells are usually very delicate and loosely packed, hence the soft and spongy character of these plants. The Lichens have the cells developed to a horny or papery consistence, giving them that dry and rigid character which is so peculiar to this tribe. The Algæ, on the other hand, inhabitants of water, are soft and gelatinous in texture, acquiring greater substance and a grisly, or even somewhat horny nature, in those instances where they are exposed to violent external influences, as of the beating of water upon the rocks where they flourish. In all these plants the processes of nutrition are very simple, there is no distinction into leaf, stem, and root, and every part of the plant is equally capable of performing any of the functions belonging to the life of the plant. In the Algæ, for instance, all the cells are engaged in the process of assimilation of the nutriment derived from the water in which they live; each cell is at once its own root and leaf, absorbing the crude food, and converting it into organized matter. The Lichens live in the same way, on the moisture they absorb from the air; and the Fungi in decomposing liquids or other decaying matters. The only kind of circulation we can imagine to exist here, is a distribution or equalization of the fluids throughout the textures, where, for instance, a part of the plant fully exposed to moisture conveys a portion of its absorbed fluid to a drier part, in a manner which may be roughly compared to the soaking of water along a piece of blotting-paper, or through a sponge or other porous body.

Connected with this physiological independence of the cells in regard to nutrition, we usually find an equal independence of vitality, that is to say, the cells, thus combining all the nutrient functions in themselves, are capable of sustaining life and continuing their growth when separated by external violence from each other. But to this point I shall return hereafter.

Advancing to a higher class of vegetables, we find in the Mosses very distinct signs of a more elevated organization. Here we first see a true distinction of parts which may be properly called leaf, stem, and root. and corresponding to the marked increased variety of components of the outward form, we find a new kind of structure in the interior; we now find the cellular tissue strengthened by a regularly arranged woody skeleton. The Mosses in general are almost wholly cellular. but in them we find the first traces of the fibrous formations which in their more highly developed condition constitute the wood and fibrous bundles of flowering plants. Thus the thread-like cellular stem of a Moss has a fibrous core, as it may be called, a little bundle of true woody tissue running up its centre, and in some instances sending off little branches to form mid-ribs to the leaves; these leaves are usually single layers of flattened plates of cellular tissue, closely resembling the leaf-like expansions found in some of the Algæ, but sometimes these cells are strengthened by curious spiral deposits in the interior, as in the Sphagnum or Bog Moss. The roots are mere threads formed of several rows of very delicate cells, and these roots, which penetrate the soil, now exclusively exercise the office of collecting food for the plant, while the functions of digestion and respiration are removed to a separate seat in the leaves; we now no longer see that uniformity or indifference of colouring in the different parts of the plant, the absorbing roots contain only colourless juices, while the leaves owe their tint to the presence of abundance of that highly organized form of assimilated food, the chlorophyll granules or vesicles.

The tribes standing between the Mosses and the flowering plants, namely the Club Mosses, the Ferns, and their allies, differ principally from the first in their greater complexity, but they also present us with the first examples of the spiral structures in the so-called vessels or ducts. The woody column running up the centre of the stem of a Lycopodium or Club Moss, for example, consists of a perfect "fibro-vascular bundle," that is to say, it is no longer a thread of simple elongated wood-cells, but is composed of a number of "spiral vessels" (*i. e.* very long and slender cells with a spiral fibre coiled up in their interior) surrounded by a considerable collection of wood-cells. In the Ferns, where the stems acquire much greater size, growing even into trunks rivalling those of the Palms, we find the "skeleton" of the stem composed of a number of analogous "fibro-vascular" bundles, arranged in an irregular ring; and, in the older conditions of the arborescent kinds, these acquire great solidity of texture. The subdivisions and branches of this skeleton, which run out to form the ribs and veins of the leaves, partake of the higher character of organization, and we find the veins of the leaves of Ferns, &c., to contain spiral structures similar to those of the bundles in the stem of which they are prolongations.

In the flowering tribes we have to distinguish two great divisions, differing in almost every respect in their structure, and in no point more than in the anatomy of their stems. These divisions are called the Monocotyledons and the Dicotyledons, from the condition of the embryo or germ contained in their seeds; they have also been called Endogens and Exogens, from a supposed contrast in the mode of growth of their stems, but the hypothesis on which these names were grounded was the result of imperfect observation, and since no such *thing* as Endogenous growth, in the sense originally intended, does exist in the Monocotyledons, the names should be given up.

In the Monocotyledons, the simplest forms of stem are composed of a mass of cellular tissue strengthened by a number of completely separate fibro-vascular bundles (consisting of an assemblage of spiral, and annular cells, with ducts and woody tissue,) which, when carefully traced, are found to arise just within the rind of the stem, to pass more or less slantingly upwards and inwards, till they nearly reach the middle, then to turn out again to arrive finally at the leaves, into which they pass out to form the ribs and veins. As they exist in large numbers, they form an almost inextricable interlacement by their crossings in the different parts of their course, but they remain quite isolated from each other, imbedded in the cellular tissue of the stem, and after the first year alter only by increasing in density from the addition of woody deposits inside their cells. In herbaceous stems they are readily to be detected as woody strings running through the spongy cellular tissue; in the arborescent Monocotyledons, such as the Palms, they frequently become consolidated into one mass, by the cells of the general tissue of the trunk becoming converted into solid wood, but even then their isolated nature may be distinguished by their appearing as separate spots in a cross section. The large orifices seen in a cross section of a common cane are the ends of large ducts, and each hole marks the centre of an originally isolated bundle. Such stems only grow by the addition of new parts, totally distinct lengths of the stem with new isolated bundles, while the older portions only grow by mere expansion or consolidation of parts already existing. The roots of Monocotyledons are traversed by fibro-vascular bundles which arise in contact with the ends of those of the stem, just beneath the rind; they form a solid core to the fleshy roots, and enter all the sub-divisions. It should be observed here, also, that the roots of Monocotyledons are always lateral or *accessory*, as they are called, these plants never producing a *tap-root*, that is, a root forming a direct continuation of the stem downwards. The peculiarities of the stems of Monocotyledons may be studied by examining the course of the fibro-vascular bundles, in such plants as the Flag, which has a creeping, underground stem or rhizome, in the Asparagus; in the little conical solid part from which the scales of bulbs arise, in the Grasses, in Canes, and, where accessible, in Palms; but it requires much care and patience to investigate them thoroughly.

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THE COURSE OF THE SAP IN PLANTS.

By J. TOWERS, Esq., C.M.H.S.

SUBSEQUENT to the few remarks made in a recent article on the *descent* of the sap, others have suggested themselves, partly in consequence of a paper in *The Gardeners' Chronicle* of June 29th last, by Professor Henslow of Hitcham, to which we must take the liberty to devote considerable attention. That gentleman says, "I consider the fact established that an absorption of water, with whatever it may hold in solution, is constantly taking place through the extremity of the rootlets, and that this 'crude sap' is carried forward either through *intercellular* passages, or through particular vessels (tubes, of which there still seems to be need of better proof), or through both, by a force which acts by '*propulsion*,' and not by '*attraction*.' The celebrated experiment by Hales upon the Vine, and the experiments of Dutrochet and others, have established this."

We are not now considering the actual "*descent* of the sap" by "force of gravitation"—like that of water or quicksilver from the top to the bottom of a tube, suggested by some: the object pointed to by Prof. Henslow is widely different from that; and it involves those very mysterious phenomena which have so long been hampered by many conflicting theories. Mr. Knight of Downton, appears to have approached the truth when he stated that the sap ascended through *cells*—and so far he met, and interpreted the theory of Dutrochet's *endosmose*, whereby fluids of different densities were shown to permeate through membranous tissues, and commix, till they mutually acquired an equal, or nearly equal density. The question, however, which now claims our notice arises out of the opinion hazarded by Prof. Henslow, that the sap is propelled—and not *attracted*, upwards.

What—I would ask—is propulsion—what and where its agent? The ground is unquestionably the medium which supports the roots of a plant, through which also they ramify in search of food. The plant is an organized body, endowed with a vital principle, and pervaded by *vitalized* fluids—which like the living blood of animals, resist the decomposing action of chemistry, and effectually preserve the entire body from putrefaction so long as the vital principle is maintained. Now, if a living plant require, and seek its food—whether by an act of volition, or as stimulated by an agent from without, by what term can we define the act by which it draws appropriate food from an inert mass of earth, *through* a spongy tissue of rootlets, into its ascending cellular system—other than by that of *attraction*? I have long been convinced that to *Electricity* we must refer for the interpretation of all the phenomena of purely vegetative life. Electricity (be its essence, as an emanation from Creative Power, what it may), is everywhere, in every particle of matter, and always in action when moved even by the faintest breathing that could disturb the cobweb's fibre! Electricity attracts, and then induces an *opposing* condition, which produces the appearance of repulsion. Let the atmosphere be in an active, or as it is termed, *positive* state, the fluids prepared in the soil are then attracted, and drawn upward through the sap-vessels; at the same time, a contrary, or *negative* state being induced in the ground, those fluids appear to be driven or propelled by a force setting toward the roots, and thus far may justify the theory of *propulsion*. Reverse the conditions, and the effect will be a change of the action in the vitalized fluids.

So far, electricity appears to furnish us with sound general data; but we cannot attain the minutiæ of active forces. Such understanding and knowledge are too high and wonderful for us!!

"If," continues Prof. Henslow, "Mr. Beaton had cut away the two buds at the end of this Vine-branch," (see extract above alluded to, as at p. 117, *Gardeners' Chronicle*,) "he would have found it filled with sap notwithstanding such mutilation; and if he had taken a portion on a perfectly dry branch, held it vertically, and poured water upon the upper cut surface, this would have been imbibed, and have ultimately passed through, and dropped out at the lower end. It cannot be assumed as an axiom, that the sap descends, as well as ascends in the way he describes; for trees are not transparent, and we cannot see this to be the case. We must test the fact by experiment, and his experiment is not sufficient for the purpose."

Here we may refer the reader to the late article on the descent of the sap, for the facts adduced on the authority of the late Mr. Knight, which appear to comprehend all that has come under the observation of the keenest microscopic investigator. Those facts I find supported by the following remarks of Professor Henslow. "But allow the branches to be filled as you will with crude sap, then, by exhalation through the stomata" (pores in the leaves) "a large amount of the water is carried off, leaving what is held in solution in the remainder of the water. The stimulus of light, acting on the cellular tissue of the leaves, enables those parts to concoct the organic compounds—sugar, gum, &c., which are soluble in water, and are capable of being transmitted through the membranes of the cells, into the same spaces that are occupied by the crude sap. Thus, a general diffusion of such organic compounds throughout the plants takes place; this diffusion has been termed the 'descent of the sap.'"

In few words then, we may safely conclude that the course of the sap is first from the roots upwards, by a direct ascent through the sap-cells of the alburnum, or green annual layer of *wood* in trees; and in herbaceous plants through appropriate representative tissues, till it enters and pervades the leaves, wherein the processes of *transpiration* and of laboration are carried on; that thence, the prepared fluids are conducted downwards, partly as the matter of Cambium (proper juice—the *Indusium* of Main), whence, the *Liber* or fresh layer of Bark is organized, and with it, the newly secreted portion of the medullary processes that converge horizontally toward the pith, and which form the silver grain of trees and shrubs.

Therefore, that there is no simple movement of descent from the summit to the roots, or one of circulation—of flow and return, whatsoever; although, as Mr. Knight asserted many years ago, that there may be a commixture of the raw ascending sap, with portions of the laborated fluids that have "sunk into" the horizontal medullary tissue, which is found in every part of the stem; and by which the several layers of wood, however aged a tree may be, are preserved firm so long as vitality and health are supported.

Some persons have endeavoured to establish a theory of the "descent of the sap," by the irregular healing of wounded bark; first and chiefly—as they say—at the uppermost edge of the wound; but this is met at once by the fact that wounded bark and abraded surfaces of the wood, do not so heal of necessity; much depending upon arbitrary circumstances, and the nature and extent of the injuries. Observation must convince every careful impartial person that such is the case; and, that in numerous instances, the cortical matter comes "rolling over" in every direction pretty much alike, and sometimes most extensively on the lower edges. I conclude this paper with the following interesting passage from Prof. Henslow's article:—"I do not suppose that gravity has much to do in affecting the question at issue. Unless my memory fail me, it has been proved that the upper edge of a wound on a 'ringed' branch, when purposely bent downward in order to test this point, has been found to form a larger amount of new tissue than the other edge, (though this latter was now uppermost in position). If a wound on the trunk of the tree bear a small proportion to the whole surface, we might also expect very little or no difference between the amount of matter formed on different sides of the wound." And, such is indeed the result, as careful observations made on almost any hedge-row elm-trees will verify.

STANDARD ROSES.

SO long as English gardens afford examples of beauty and cultivation, for all the rest of the world, so long will the Rose maintain its position as the popular favourite. We have flowers with greater brilliancy of colour and chaster symmetry of form, which bloom earlier and last longer—whose value is even increased by their having no thorns; and yet, in whatever aspect it is viewed, whether as being hardy and easily grown, or as fragrant and agreeably coloured, or as handsome and beautiful in all its parts, or whether it is associated with the sports of childhood and the pleasures of old age—the Rose, both of the garden and field, has more fond admirers than any other flower either native or exotic, the emblem of the country itself, no other flower is so fit a representative of an English garden, and no other flower has stronger claims to embellish the architecture of an English home. Since, then, the Rose is so much and so justly esteemed, it is not surprising that its cultivation should be carried on to an extent commensurate with its great merits, and unequalled in any other country.

It is thought, however, that its culture as a standard, has been kept somewhat stationary and that but few persons are aware of the magnitude to which the Rose may be grown, or the admirable effect which it may be made to produce on a lawn or pleasure ground; yet with a sufficiently strong stem, and a system of careful and patient training, there can be no reasonable doubt but that standard Roses could be grown to the size and form of the ordinary examples of Weeping Ash, having the branches all produced from the top of a single stem, and flowing downwards on all sides; thus forming at the same time an example of English cultivation, and a very ornamental object for a lawn. It may be also observed, that the construction of a comfortable seat round its stem would afford a cool and fragrant retreat during the hot days of summer, so that in fact those who could not enjoy the luxury of a bed of Roses might at least have the curtains.

It is not wished to be inferred, that either the Dog Rose or the Manettii Rose, could be grown to the strength of the Ash stem, nor is such vigour necessary in a standard, trained in the manner alluded to. There does not seem, however, to be any reason for supposing that either may not be grown ten or twelve feet high, and with proportionate strength. But the chief if not the whole support for the head must be provided artificially by driving down a stout stake or pole, to which the stock may be fastened, and then the branches directed downwards to small hoops of wire of any diameter, from five to fifteen or even twenty feet according to taste. The climbing or spreading sorts of Rose are of course the most suitable for growing in this form, but indeed almost any Rose may be selected; and if in the course of a few years the branches are carried out to a great radius, some light props might be necessary to the wires at the interior. If grown simply as an object of decoration on the lawn, the standard may have a stock about seven feet in height, and the diameter of the head at the extremity of the branches, may be about five feet, so that in general form it would appear like a blunt cone. But if it is desired to combine the ease of the arbour with the elegance and beauty of the tree, then it must be grown to a larger scale, and provided with a seat round the stem. In this case the branches should be trained to the ground, so as completely to conceal the interior, an entrance being left at one side. The general management of the tree when once well established, is similar to that of Roses grown in the common way, and therefore need not be entered upon here.—P. F. K.

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Miscellaneous Notices.

Seedling French Grapes.—Jouanen: Fifty-two seedlings of this Vine have fruited. Its habit is vigorous, the berries are oblong, and ripen about ten days before the common Chasselas, but are produced less freely; When raised from seed it presents the same defects, and is rather later. *Morillon panache* bears Grapes that are mostly black, a few white, some speckled, with much variety of foliage, form, and size of berry; all in the way of the Morillons, from which, in France, wine is made. *Isabel* (the *Alexander* of the United States), is very remarkable for its productiveness, and well deserving of attention by those who are curious, or interested in vegetable physiology; the plants raised from it vary much in general character. From a sowing made in 1836 and 1837, of this Vine, about seventy plants were obtained, which assumed the most singular foliage. In some cases the leaves were like those of the Italian Poplar, the Maple, the Plane, and others, all unlike the usual form of the Vine leaves. All sizes are represented; some are very thick and much notched, but those Vines so singular in structure have not fructified. Among the plants having larger leaves, a few have borne passable fruit—one black variety, and three varieties, respectively white, yellowish, and red-brown. In these, the flavour of the Isabel is considerably modified, being less high, and more agreeable. In respect to size, that of the Isabel has never been surpassed, and rarely attained: the berry varies from the round, to the oval-oblong in form. The Isabel was obtained about 1816, from a sowing of the seeds of Vitis labrusca. *Muscat Jesus.*—Thirty-four plants raised from this, have borne fruit. If we except the Chasselas Musqué, this white Muscat has been hitherto among the first to come to maturity; but there has just been obtained from seed one which ripens ten or twelve days before it. The Muscat Jesus, though very good, has the defect of cracking when nearly ripe. The variety obtained appears to be free from this defect. In the greater number of plants raised from the seed of the Muscat Jesus, the musky flavour is not perceptible, in others it is very faint, except in extreme maturity. The berry varies very much in form and size, always white, and inclined to crack. The Muscat Jesus is known under four or five different names. *Muscat Caillaba*, like most other Muscats when raised from seed, in part loses its musky flavour, and presents a great variety of foliage; four white kinds have been obtained, but they are late, and have little of the musky flavour common to the type. One of the most desirable has the leaves much cut, with the berries larger than in the Caillaba; the bunches are very handsome, and rather later than the Muscat noir d'Angers, but earlier by ten or fifteen days than the common Muscat noir. There have also been obtained from this sowing, two plants of Muscat noir hâtive.—*Ann. de la Soc. Centrale de Hort. de France.*

On Plant Potting.—The organic part of plants generally amounts to about nine-tenths of their whole bulk; and as this matter is chiefly produced from, and through the influence of, atmospheric air and water, and these being largely extracted by their roots as well as by their leaves, it points to the propriety of having the soil in a condition to allow an unimpeded access of these gases to the roots of plants. For some years I have used nothing but *turfy loam* for the various purposes of potting, suiting it to different plants by the addition of charcoal, pebbles, and sand,—being guided in the proportion of these latter substances by the nature of the roots and general habit of growth; and as by the judicious application of manure water, when and where requisite, I obtain, through simple means, all the advantages that can be derived by the use of the various mixtures recommended under the name of composts, I therefore look upon these, in many cases, minute proportionals of different soils and manures, as being altogether unnecessary. There is by far too little importance attached to the aëration of soils; by bringing them in contact with air both the mineral and vegetable ingredients are decomposed, their latent powers of action drawn out, and rendered directly available for the purposes of vegetation. Hence the advantages of trenching and subsoiling, the freezing and pulverizing of soils; and though it is impossible, in the present state of knowledge, to trace all the operations of the various agents that are daily producing changes in the animal, vegetable, and mineral systems, we know that in the absence of air and moisture, substances may remain unchanged; but under their combined influence, the most imperishable must ultimately succumb. In collecting soil for potting, I prefer turves cut from a dry pasture, secured in dry weather, and piled in a heap until wanted for use. If these have been procured from soil of a retentive, adhesive nature, it can be corrected by the addition of sand, charcoal, &c. Charcoal is both a chemical and a mechanical agent. Its value as a manure is derived from its property of absorbing moisture and various gases- particularly ammonia. A celebrated chemist says: "Charcoal is capable of being used with advantage in abstracting the ammoniacal and other salts, which gives its value to the liquid of farm-yards. Experiment has shown that when filtered through a bed of charcoal the liquid escapes without colour, and almost without taste, while the charcoal is itself converted into fertilizing manure." Such is the theory of its action; and its practical efficacy has been sufficiently proved to rank it as a valuable ingredient in soils. The heap should be frequently turned over, to expose every part of it to the influence of the weather, and preserve it in a healthy state; and that it may be of easy access during winter, it should be kept under cover and always used in as rough a state as the size of the pots will conveniently allow. In the first place, the pots should be thoroughly clean and dry; and as complete and efficient drainage is indispensable, the material used for this purpose should be in quantity corresponding to the size of the pot. Broken pots, or *crocks*, as they are generally termed, are most in use; but charcoal, bones, bricks—broken up—or small stones, will answer this purpose equally as well. When the pots are large, a good system is to invert a small pot in the bottom, filling the space between it and the side of the pot with the drainage. A plant should not be potted when it is very dry, nor when soaked with wet. If in the former case, it is very likely to remain so, as the water will pass through the fresh soil without penetrating into the old ball of earth; and if in the latter state, it is not in a very good condition to be surrounded with an additional layer of earth. When the roots are thickly interwoven they should be carefully disengaged, that they may be spread out into the fresh soil; but in shifting young, healthy, growing plants with the roots just reaching the side of the pot, they should not be disturbed, as it is important to preserve the smaller fibres, upon whose action the health of the plants chiefly depends. In cases when the plant is unhealthy and the roots in unfavourable soil, or in repotting deciduous plants that have been kept in a state of rest during winter, the ball of earth should be broken up and nearly all shaken out, that the young roots may at once enter the fresh soil It is also necessary to examine the stem, in order to guard against deep planting. The ordinary advice—"Never plant deeper than before," is well enough, *provided it was not deep planted before*. But this is too frequently the case to be passed over in this way; and when plants are raised from cuttings, they must necessarily be deeper planted when young than is consistent with their future welfare; the soil should be cleared away until the base of the stem is level with the surface. I have seen valuable plants lost through neglect in this respect, even after they had attained considerable size. It is necessary, especially in potting hard-wooded plants, to make the soil moderately firm. It should not, however, be *rammed*, but rather fitted in, spreading the roots into the fresh soil, finishing off with a level surface, and leaving sufficient space for watering.—*Horticulturist.*

The Pleasures of Gardening.—We know not one fancy, one recreation, so unalloyed in all its points as the cultivation of a garden. It seems to afford, in common with all the rest of the fancies, the full enjoyment common to all, and *to have a large* balance *in* its *favour*. The *miser* over *his* treasure *gloats* not *more completely upon* his money than the gardener does upon his choice fruit, flowers, and vegetables. The picture-collector is not prouder of his paintings than the florist is of his Tulips; nor does the owner of the ancient gems of art point them out with more satisfaction, than the gardener shows his best named flowers. If the owner of a gallery of pictures has his Rubens, his Leonardo da Vinci, his Paul Potter, so has the owner of a bed of Tulips. The florist combines in his single garden as many fancies as would occupy half the population, and delights in all of them. What if the conchologist boasts of his collection of shells? He can only look at them in one state; there they are, always alike, no change; only a few people can see them at once, and not one in a thousand, though they may be pleased with the beauty, can estimate the rarity of them. The antiquarian pores over his coins in solitude; he boasts perhaps, that this crown, that guinea, or the other medal, are the only known ones in existence; but can he increase them? Can he oblige a single friend with an offset? Will it ever be better? but, if another be found like it, will it not be worse? What has he rare that the florist may not in his own estimation equal? The Tulip-grower would say, "What coin have you got equal to my fine Louis XVI?" And no possessor of the only coin of a kind, prizes himself more upon his treasure than a florist does in twenty different flowers of twenty different families. The lover of the garden is a general collector, and a creator of new beauties into the bargain; he sows his seed with pleasure, he watches the progress of his plants with interest, he looks for their opening flowers or swelling fruits with anxiety; and if his hopes are crowned by one solitary plant, fruit, or flower, better than his present stock, he is repaid for all his trouble, labour, and watchfulness; if not, he begins *again, nothing* daunted, saying to himself, "Bad luck now, better another time." Is there any fruit eats so sweet as that from our own garden? Does not every day develope some new claim to our attention? Every new visitor in the form of a flower, or fruit, or vegetable, is a welcome one. *A man does* not go into his garden, as he *must* into *a* gallery of pictures, a cabinet of coins, or a museum of natural history, to see the same things in the same places time after time: he finds something new every day: his beds of Tulips and Ranunculuses, his collections of Picotees, Carnations, and Pinks, his Pansies, Dahlias, Auriculas, Polyanthuses, and other flowers, come in, one after the other, to reward him for his recreation—for, though there be much exertion occasionally required, he will not call it labour. His vegetables and his fruit repay him for the trouble and expense he incurs: and, after all, there is one sweetener to all his cares, one refreshing reward for all his anxieties, one circumstance that gives an additional relish to all he personally enjoys, and it is this,—he has not to seek *a connoisseur* to participate in his happiness, *for* ask whom he may to see his establishment, all the classes of society are delighted with a well-kept garden. It delights all the senses; its fragrance, its brilliancy, its usefulness, all speak to us in language not to be misunderstood upon the numerous pleasures and duties which are inseparable. But there is one point of which we must *not* lose sight,—it is the facility with which every class of society can accommodate his gardening to his means, and yet excel as far as he goes; one cottager, with scarcely more ground outside his house than his house covers, can be king above his neighbours for the growth of Stocks; another prides himself upon his double Larkspurs; *a third* will allow *none to surpass* him in Pinks; a *fourth* will shine in Pansies, *and* so, *according to* the means at his disposal, the owner of a garden may be ambitious, successful, and happy.—*Thomas Miller.*

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New and Rare Plants.

Tropæolum Beuthii, *Klotzsch.* Beuth's Indian Cress (*Allg. Gard. Zeit.*)—Nat. Ord., Tropæolaceæ § Tropæoleæ.—A small climbing greenhouse herbaceous plant, resembling *T. brachyceras.* The leaves are peltate, roundish, deeply cut into five or six obovate leaflets, which are bright green above, paler beneath. The flowers are yellow, with a short straight spur, and obcordate petals twice as long as the divisions of the calyx. From Bolivia. Introduced in 1849. Flowers in spring. Messrs. Low, of Clapton.

Oncidium nigratum, *Lindley.* Black-spotted Oncid (*Paxt. Fl. Gard.*, i., 58).—Nat. Ord., Orchidaceæ § Vandeæ-Brassidæ.—A curious and distinct stove epiphyte, allied to *O. phymatochilum.* It has branching panicles of pale yellow or cream-coloured flowers, the sepals and petals linear-lanceolate, marked with a few irregular brownish-black blotches; the lip is triangular, brighter yellow, with a brown stain or two below the point. From Guiana. Introduced "many years since." Flowers in summer. Messrs. Loddiges, of Hackney.

Oncidium trilingue, *Lindley.* Three-tongued Oncid (*Paxt. Fl. Gard.*, i., 42).—Nat. Ord., Orchidaceæ § Vandeæ-Brassidæ.—A curious stove epiphyte, of which the leaves and pseudo-bulbs are undescribed. The flowers grow thinly in a half-climbing racemose panicle, and are of a deep chocolate brown, the petals and crest of the lip edged and spotted with bright yellow. From Peru. Introduced about 1848. Flowers in spring. Sir P. M. Egerton, Bart.

Oncidium longipes, *Lindley.* Long stalked Oncid (*Paxt. Fl. Gard.*, i., 46).—Nat. Ord., Orchidaceæ § Vandeæ-Brassidæ.—An unimportant stove epiphyte, with oval two-leaved pseudo-bulbs, and a scape bearing two flowers on long peduncles; the colours are yellow and brown. Supposed to be from Brazil. Introduced through M. Morel, of Paris, about 1845. Flowers in April.

THE STANWICK NECTARINE.

DESCRIPTION.—Fruit medium-sized, in our specimen rather below this, roundish oval; skin pale dull yellow, becoming deep violet with small brownish specks where fully exposed, and passing off to bright red, richly broken towards the shaded parts. Flesh greenish white, or very pale greenish yellow, with a slight tinge of red next the stone, which separates freely; "tender, juicy, rich, and sugary, without the slightest trace of the flavour of prussic acid;" when thoroughly matured on the tree it is said to be very high flavoured. Stone middle-sized, very rugged, ovate, with a prominent point, and sharp edge, and of a deep tawny brown; "the kernel is sweet like a nut, possessing nothing of the bitter almond flavour." Ripe about the end of August or the beginning of September, in the climate of Yorkshire.

The tree on its own roots is a robust and late grower. The leaves have the margins crenate-serrate, and are furnished at the base with a pair of small reniform glands. The flowers are large, and of a palish pink colour.

HISTORY, &c.—This valuable Nectarine, described by Dr. Lindley, as being as far beyond all other Nectarines as the Green-gage Plum is beyond all other Plums, was introduced to this country by His Grace the Duke of Northumberland, to whose liberality we are indebted for the specimen of the fruit from which our drawing was made. The first account of it was given by Mr. Thompson, in the *Journal of the Horticultural Society* (i., 272), from which it appears that His Grace raised it from a stone given him by Mr. Barker, formerly Her Majesty's Vice-Consul at Aleppo, now residing near Suedia, in Syria—a gentleman who has been instrumental in introducing some other valuable Syrian varieties of stone fruits to the gardens of this country. The seeds thus obtained, were sown in March, 1813, in his Grace's garden at Stanwick Park, where, under the superintendence of Mr. Crawford Baillie, the first fruit were ripened in August, 1816, the variety having been budded in the autumn of 1843 on the Bellegarde Peach.

The Stanwick Nectarine has acquired more than ordinary celebrity among horticulturists, from the fact of the munificent surrender of his property in the variety by its noble owner, and the application of the proceeds of its sales, after defraying the expenses of propagation,* to the charitable purpose of aiding the funds of the Gardeners' Benevolent Institution. Mr. Rivers, of Sawbridgeworth, undertook its propagation; and, on the occasion of the anniversary meeting of the Institution, on the 15th of May in the present year, the first twenty-four plants—which had been obtained by grafting—were disposed of at Stevens' Rooms, at prices varying from £2 2*s*. to £10 10*s*. each, realizing, in the aggregate, the sum of £164 17*s*., which, together with the money which may be realized by any further sales, is, by the wish of the noble Duke, to form the nucleus of a fund for the construction of almshouses for aged and indigent gardeners. It is understood that Mr. Rivers will have a number of plants for a further public sale in the course of the present autumn.

Mr. Baillie states that the tree on its own roots grows late in the autumn, even retaining its leaves through the winter. Worked upon Apricot, Plum, or Almond stocks, he has no doubt it will prove quite hardy, and bear well, even in the north of England. We learn, from good authority, that the flavour of the fruit when gathered early and artificially matured, as was the case with the specimen from which our description was drawn up, is inferior; and that the fruit requires to be fully matured *upon* the tree to acquire its proper flavour.

Like other cultivated fruits, this also appears to have its peculiarities in respect to the stocks upon which it is worked. As far as these peculiarities have been observed, they are explained in the following extracts from a letter, with which we have just been favoured by Mr. Rivers:—

The buds sent me in August, 1849, from Stanwick, were partly inserted in Muscle Plum stocks and partly in a French Plum stock, called the Damas noir, or Black Damask Plum. They all appeared to take well, and remained plump and sound all the winter. In the severe frost they were protected by inverted flower-pots. In spring, those on the Black Damask Plum broke freely, those on the Muscle not so. The severe frost on May 3rd, made sad havoc with them; out of eighty buds on the Muscle stock, not more than two plants survived. Those on the Black Damask escaped much better, and are now fine vigorous trees from four to five feet in height, furnished with healthy leaves, some of them eight and a half inches long, remarkable for their sickle shape, the footstalks being profusely covered with fully-developed reniform glands. It is, I apprehend, somewhat tender while in bud; for, what are called "French Peaches," such as Grosse Mignonne, Gallande, &c., on the same kind of stocks, and in the same quarter, without the least protection, did not receive the least injury.

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* It is but right to state that Mr. Rivers made no charge for propagating this fruit.

"In 1849," Mr. Rivers writes, "I raised one seedling from it, which is now a plant five feet high, and in a bearing state. This season, I have raised three more. They are all exactly alike in their foliage and habit. In the leaves of these seedlings the reniform glands are minute, and borne, not on the footstalks as in the young plants of the parent sort, alluded to above, but on the base of the leaves themselves." In the leaves from the parent tree, which accompanied the fruit sent to us, and which are represented with it on our plate, the glands as there shown were of small size, and were situated, not on the footstalks as in Mr. Rivers' vigorous young trees, but on the base of the leaves; which latter were variable in form from the usual broad and elongate lance-shaped outline, to oblong, suddenly contracting to a point. From the Stanwick seedlings which Mr. Rivers has reared, we learn that he entertains hopes in a generation or two, of raising up a new race of melting Nectarines adapted to our climate.—M.

CULTURE.—In the cultivation of a garden few things are of more importance, or, when properly managed, impart a more beautiful appearance, than well trained wall trees, for as judicious training is not incompatible with abundant fruitfulness, there is no reason why fruit trees of all kinds should not be systematically and properly trained. The first step to successful training is, without doubt, proper planting, for no matter how well a tree may have been prepared, if it be not properly planted, and in soil suitable to its certain requirements, success in its after management is quite out of the question.

Now, of all wall fruits, that which is called stone fruit is the most difficult to manage, inasmuch as being constitutionally more delicate than Pears and the like, the trees are liable to suffer from change of seasons and other atmospheric influences, which have little or no effect upon other kinds. To change the climate of a place is a difficult matter, but it is possible so to modify our treatment of the plants as to enable them to suit themselves to circumstances comparatively unfavourable. The greatest enemy to the proper management of stone fruit is a retentive soil and defective drainage, or, as is too frequently the case, no drainage at all. In such a situation, all the evils attendant upon immature wood speedily present themselves, in the form of suckers from the roots, gum, canker; weak and unhealthy growth in the spring, accompanied by blister, blight, mildew, and shoals of insects; strong growth in the summer, too strong to be properly ripened, and consequently a defective blossom, and a very short crop of fruit. Again, if the wood is immature it contains too much moisture, and by a sudden thaw after a severe frost the sap vessels are lacerated, and the plant is speedily reduced to a complete wreck. These are some of the evils which proceed from the accumulation of water in the soil, and we may here remark that the same results will follow, in stone fruits, on comparatively dry soils, if they are highly enriched with raw cold manure. Strong and rampant growth in all soils and in every situation is opposed to the proper management of stone fruit trees, and the treatment which tends to such a result is wrong in principle. Some years back we saw in several of the Dublin nurseries, Peach trees which, from the maiden plant, had made shoots four to six feet long; strong basket rods which would have required an Italian sky, rather than the humid atmosphere of the Emerald Isle, to have brought them to maturity. Shortly afterwards we had to select some trees to plant, and when we marked the weakest plants, the nod, wink, and shrill whistle peculiar to Irish wisdom, was liberally expended by the workmen upon our Saxon ignorance. In taking the plants up, we found that they had been manured with cow-dung and garbage from the slaughter-houses; the roots were like whip-thongs, three or four feet long, with scarcely a fibre upon them; in fact, the whole system of the plant was in as satisfactory a state of plethora as the most thorough-going tree-destroyer could possibly desire. In England, likewise, we have seen very gross trees, and they do admirably for gentlemen gardeners, and amateur cultivators, who look more to the quantity than the quality of their purchases. The criteria of a good trained tree, to procure from the nurseries, are that the stems should be clean and short, the branches equally balanced on each side as to size and quantity, the joints short, the wood firm and hard, and the main roots moderate in size, and thickly covered with fibres. Avoid, by all means, strong and unequally balanced trees; rather plant small ones, as we have no doubt they will be found more satisfactory.

From the preceding remarks it will be seen that the first thing in the cultivation of the Peach, after procuring good trees, is the preparation of the border. Therefore, as a first step, see that it is deeply and thoroughly drained, and if the sub-soil is clay, make the bottom of the border to slope from the wall to the drain, and cover the entire surface with concrete to the depth of three inches. We are quite aware that impervious bottoms to borders are objected to by some excellent cultivators, contending, as they do, that concreting is contrary to nature, and that it intercepts the flow of terrestrial heat. We, for our part, see no objection of the kind; on the contrary, we look upon the impervious bottomed and walled in border, as a large flower-pot filled with suitable compost, and where the roots of the plants cannot get into bad soil, but are always under the control of the cultivator. Such an arrangement, even under tolerably favourable circumstances, must be preferable to allowing trees, calculated when properly planted to stand for half a century, to run into soil where they must soon become useless, and have to be replaced. Over the concrete six or nine inches of drainage must be placed, and the soil should not be less than two feet six inches in depth. Of soil for Peach trees, a good hazel loam from an old pasture or common, cut from four to six inches deep, according to the quality of the under soil, liberally intermixed with road scrapings from hard roads, is the best. These, if the soil is heavy, may be used in equal proportions, but if the loam is light one-third of the road sand will be sufficient. Two years back we planted a quantity of stone fruits in a compost of this kind, and we never saw trees produce such an abundance of first-rate roots, indeed they were so numerous that it was found impossible to get the soil away from them at the time of transplanting. Compost so prepared should be mixed a few months before planting, but this is not indispensable.

As the Stanwick Nectarine is found to ripen so far north as Darlington, it, no doubt, will prove a first-rate fruit in the southern counties of England. We shall recur to the subject of Peach culture in a future article.—A.

New and Rare Plants.

DENDROBIUM CREPIDATUM, *Lindley*. Latchet-lipped Dendrobe (*Part. Fl. Gard.*, i., 63).—Nat. Ord., Orchidaceæ § Malaxeæ-Dendrobidæ.—A beautiful and distinct stove epiphyte, with erect slender terete stems; leaves undescribed. The flowers grow in pairs, and are about an inch across; they are of a very firm texture, white tipped with delicate pink, deep yellow in the middle of the lip, which is described as being very much like those old-fashioned slippers, which without a hollow for the foot were merely latched round the instep; the sepals and petals are oblong obtuse. From the Indian Archipelago. Introduced about 1849. Flowers in March. R. S. Holford, Esq.

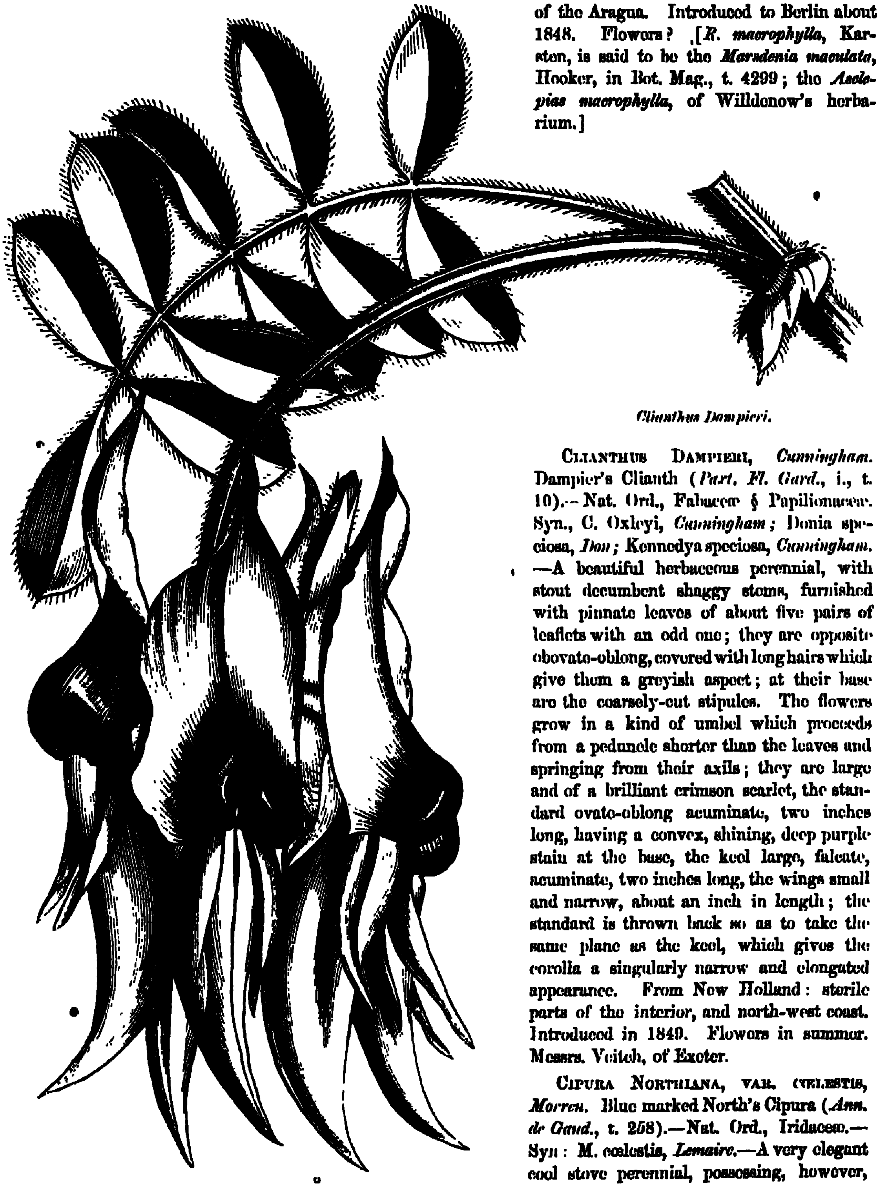
TRADESCANTIA VELUTINA *Kunth* and *Bouche* Velvety Spider-wort (*Ann. de Gand.*, v. 185).—Nat. Ord., Commelynaceæ.—A cool stove herbaceous perennial, with tuberous fasciculate roots, fleshy branching stems, softly and densely pubescent; the leaves sessile, ovate-lanceolate, cordate, amplexicaul, soft on both sides; and the flowers in many flowered axillary and terminal umbels, violet-coloured, paler outside, the filaments violet, and the anthers yellow. From Guatemala. Introduced to Berlin by M. Warczewitz. Flowers in November.

COLQUHOUNIA COCCINEA, *Wallich*. Scarlet-flowered Colquhounia (*Bot. Mag.*, t. 4514).—Nat. Ord., Labiaceæ § Stacheæ.—A tall-growing sub-scandent half-hardy shrub, the branches obscurely tetragonal, and bearing large opposite ovate leaves, from the axils of which spring the pseudo-whorls of flowers, which are two-lipped, the upper lip, back of the tube of the corolla, and margin of the lower lip red, the rest yellow. From Nepal. Introduced about 1840. Flowers towards autumn. Royal Botanic Garden, Kew.

ACONTIAS VARIEGATUS, *Kunth*. Variegated Acontias (*Ann. de Gand.*, v., 185).—Nat. Ord., Araceæ § Caladieæ.—A herbaceous stove plant, stemless, with pedatifid leaves, the seven segments subfalciform-lanceolate, sharply pointed, wavy at the margins. The spathe is oval-oblong acuminate, borne on a scape eight or ten inches long, and is convolute below, ventricose, and obscurely angled; the spadix is fragrant. From Caraccas. Introduced to Berlin, in 1847, by M. Moritz. Flowers in July.

RUHSSIA PUBESCENS, *Karsten*. Pubescent Ruhssia (*Ann. de Gand.*, v. 382).—Nat. Ord., Asclepiadaceæ §

Stapelieæ.—A stove climbing undershrub. The leaves are oval, acuminate, puberulous below, large and growing opposite each other. The umbellate rotate flowers, which grow on pedicels as long as the flowers themselves, are of a purple colour. From Venezuela: banks of the Aragua. Introduced to Berlin about 1848. Flowers? [*R. macrophylla*, Karsten, is said to be the *Marsdenia maculata*, Hooker, in Bot. Mag., t. 4299; the *Asclepias macrophylla*, of Willdenow's herbarium.]

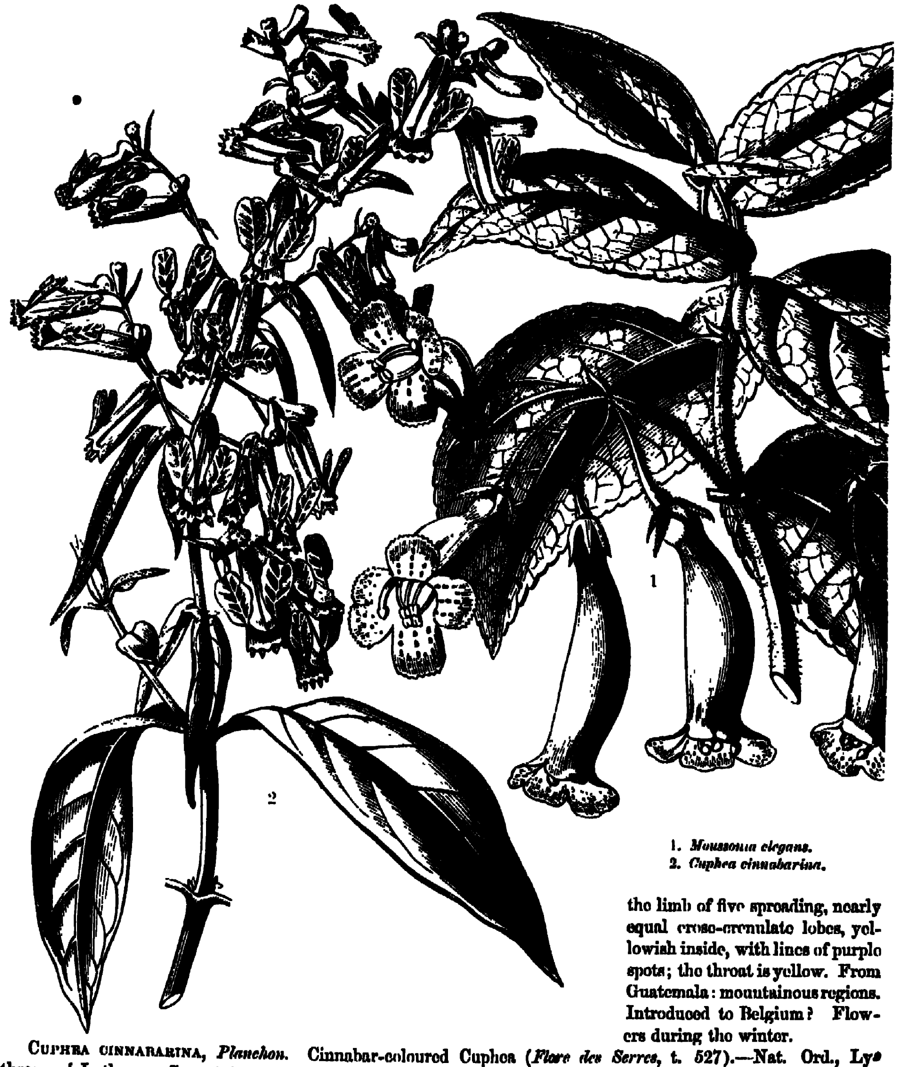


Clianthus Dampieri.

CLIANTHUS DAMPIERI, *Cunningham.* Dampier's Clianth (*Part. Fl. Gard.*, i., t. 10).—Nat. Ord., Fabaceæ § Papilionaceæ. Syn., C. Oxleyi, *Cunningham*; Donia speciosa, *Don*; Kennedya speciosa, *Cunningham.*—A beautiful herbaceous perennial, with stout decumbent shaggy stems, furnished with pinnate leaves of about five pairs of leaflets with an odd one; they are opposite obovate-oblong, covered with long hairs which give them a greyish aspect; at their base are the coarsely-cut stipules. The flowers grow in a kind of umbel which proceeds from a peduncle shorter than the leaves and springing from their axils; they are large and of a brilliant crimson scarlet, the standard ovate-oblong acuminate, two inches long, having a convex, shining, deep purple stain at the base, the keel large, falcate, acuminate, two inches long, the wings small and narrow, about an inch in length; the standard is thrown back so as to take the same plane as the keel, which gives the corolla a singularly narrow and elongated appearance. From New Holland: sterile parts of the interior, and north-west coast. Introduced in 1849. Flowers in summer. Messrs. Veitch, of Exeter.

CIPURA NORTHIANA, VAR. CŒLESTIS, *Morren.* Blue marked North's Cipura (*Ann. de Gand.*, t. 258).—Nat. Ord., Iridaceæ.—Syn: M. cœlestis, *Lemaire.*—A very elegant cool stove perennial, possessing, however, the bad quality of having very ephemeral flowers, compensated in some measure by their quick succession. The plant is herbaceous, with broadly ensiform distichous leaves, and a tall winged scape bearing the flowers near the top. The flowers are six-parted, the three outer divisions larger obovate deflexed, white, marked at the base with brownish-red transverse lines, the inner divisions smaller, revolute, greenish at the base, with transverse bands of red-brown, the upper part banded with bluish-purple. From Brazil. Introduced to Belgium in 1847 by M. De Vos. Flowers for a long time in summer.

Moussonia elegans, *Decaisne*. Elegant Moussonia (*Flore des Serres*, t. 489).—Nat. Ord., Gesneraceæ § Gesnereæ.—A rather handsome sub-shrubby herb, requiring a temperate stove. It has soft hairy stems and leaves, more or less tinged with red. The leaves are opposite, ovate-oblong acuminate, crenate-dentate, and shortly petiolate. The flowers grow in three or four-flowered umbels, on pedicels springing from the axils of the leaves; the corolla is an inch and a half long, somewhat curved and swollen about the middle of the tube, scarlet; the limb of five spreading, nearly equal erose-crenulate lobes, yellowish inside, with lines of purple spots; the throat is yellow. From Guatemala: mountainous regions. Introduced to Belgium? Flowers during the winter.



1. *Moussonia elegans.*
2. *Cuphea cinnabarina.*

Cuphea cinnabarina, *Planchon*. Cinnabar-coloured Cuphea (*Flore des Serres*, t. 527).—Nat. Ord., Lythraceæ § Lythreæ.—Syn., ? C. Llaveana, *Lindley*.—A very pretty sub-shrubby greenhouse or half-hardy plant, with strigulose branches, bearing opposite lanceolate leaves, acute and narrowed towards the point, and racemose panicles of showy blossoms; the viscid, hairy, calyx tube, is about three quarters of an inch long, pale red, with green ribs, and tips; the two enlarged upper petals are minute and of the same colour. A variety called *atro-sanguinea* has the petals deep blood-red. From Guatemala. Introduced to the Belgian gardens, by M. Van Houtte, in 1848. Flowers during summer.

Ruhssia estebanensis, *Karsten*. St. Esteban Ruhssia (*Ann. de Gand.*, v., 382).—Nat. Ord., Asclepiadaceæ § Stapelieæ.—A stove climbing undershrub, with large opposite leaves, which are elliptic, glaucous, and farinaceous below. The flowers are umbellate, the umbels many-flowered; the pedicels double the length of the flowers; the corolla rotate with a plane five-parted limb, ciliated at the margins; colour not stated. From Venezuela, near St. Esteban. Introduced to Berlin in 1848. Flowers?

Acacia macradenia, *Bentham*. Large-glanded Wattle (*Paxt. Fl. Gard.*, i., 67).—Nat. Ord., Fabaceæ § Mimoseæ.—A fine greenhouse shrub, ten or twelve feet high, with sabre-shaped leathery phyllodia eight or nine inches long, bending downwards from the flexuose branches. The inflorescence is racemose in the axils of the phyllodes; the racemes numerous, short, zigzag, bearing about half a dozen round heads of yellow flowers, "often forming an entangled mass of branches." From New Holland. Introduced, by Mr. Drummond, in 1847. Flowers in March.

Fuchsia nigricans, *Linden*. Dark petalled Fuchsia (*Flore des Serres*, t. 481). -Nat. Ord., Onagraceæ § Fuchseæ.—A pretty greenhouse shrub, nearly allied to F. triphylla. It has ovate-acuminate leaves, usually placed in whorls of three, but sometimes opposite; from these grow the axillary pendulous flowers, forming leafy panicles towards the ends of the young branches; the calyx is rose-coloured, downy inside, the petals lance-shaped, acute, flat, and dark violet colour. From Central America: in damp shady ravines on the mountains, at from 6000 to 8000 feet elevation. Introduced to Continental gardens, by Mr. Linden, in 1847. Flowers from May to November.

Spathodea speciosa, *Brongniart*. Showy Spathodea (*Ann. de Gand.*, t. 260).- Nat. Ord., Bignoniaceæ.--Syn., Spathodea fraxinifolia, *of gardens*.- A very showy arborescent stove plant, flowering occasionally when about four feet high. The plant is glabrous, with ternate impari-pinnate leaves, consisting of four to six pairs of oblong lanceolate acuminate leaflets, toothed throughout, and shining on both surfaces. The flowers grow in dense many-flowered terminal thyrses, the corolla being large, somewhat funnel-shaped, with a two-lipped limb of five sub-equal lobes; the flowers are whitish, densely marked with red dots, disposed in somewhat regular lines from the border inwards. Native country unknown. It flowered in the spring of 1849, in the Botanic Garden at Ghent; the plants having been received some years previously from England.

Calceolaria Pavonii, *Bentham*. Pavon's Slipper-wort (*Bot. Mag.*, t. 4525).—Nat. Ord., Scrophulariaceæ § Antirrhinideæ.—Syn., C. perfoliata, *Ruiz and Pavon*, not of *Linnæus*.--A strong growing and showy herbaceous greenhouse perennial, adapted for the flower-garden in summer. It grows two feet or more high, and is much branched, the stems hairy; the leaves rather large, often more than a span long, opposite and perfoliate with the broadly winged base of the petiole, the blade ovate, acute, truncate or cordate at the base, the margin doubly toothed, often lobed. The flowers grow in ample panicles, and are large, deep yellow, the upper lip inflexed, the lower almost orbicular, large, and folded against the upper; the corolla is spotted with red on the inside. From the Andes of Peru. Introduced in 1848. Flowers all summer. Messrs. Lucombe, Pince, and Co., of Exeter.

Arbutus xalapensis, *Humboldt*, *Bonpland*, and *Kunth*. Xalapan Strawberry tree (*Journ. Hort. Soc.*, v., 192).—Nat. Ord., Ericaceæ § Ericeæ.—An evergreen shrub, requiring protection in winter, and "by no means ornamental." The branches, as well as the stalks and undersides of the leaves, are downy; the leaves are oblong, flat, long-stalked, entire or very slightly serrate, with a hard reddish border; the flowers form close terminal pyramidal panicles, and are dull reddish white, egg-shaped, flattened at the base, and with a small orifice at the apex. From Mexico: mountain of Angangueo. Introduced in 1846, by Mr Hartweg. Flowers in April. Horticultural Society of London.

Hedychium chrysoleucum, *Hooker*. Gold and white Garland-flower (*Bot. Mag.*, t. 4516).—Nat. Ord., Zingiberaceæ.—A very handsome stove perennial herb, growing five feet high, the leaves a foot long, oblong lance-shaped, and sharply drawn out to a point, shining on both sides, and sub-distichous in their arrangement. The flowers are numerous, in a short bracteated spike; they are large, pure white, with a bright orange-yellow blotch on the inner series of the segments of the perianth, the anther and filament being very deep orange; they are deliciously scented. The outer series of the perianth consists of three linear segments, the inner series of a roundish deeply bifid central division, and two lateral segments of an oblong-ovate form. From India. Introduced "long" before 1850. Flowers in autumn. Royal Botanic Garden, Kew.

Lagetta lintearia, *Lamarck*. Jamaica Lace Bark (*Bot. Mag.*, t. 4502).—Nat. Ord., Thymelaceæ.—Syn., Daphne Lagetto, *Swartz*.—A small tree requiring stove temperature, interesting from the lace-like appearance of the inner bark of its stem, when separated into distinct layers. The leaves are cordate-ovate, acute, glossy. The flowers grow in short spikes, terminating the principal or lateral branches; they are pure white, or greenish white in the bud, pitcher-shaped, fleshy and four-toothed. From Jamaica. Introduced about 1844. Flowers in summer and autumn. Royal Botanic Garden, Kew.

Clematis graveolens, *Lindley*. Heavy-scented Traveller's Joy (*Bot. Mag.*, t. 4495).—Nat. Ord., Ranunculaceæ § Clematideæ.—A very elegant slender climber, quite hardy against a wall. It grows about six feet high, with smooth, slender, obtusely angled branches, bearing opposite leaves, which are variously formed—twice or thrice ternate, the leaflets ovate-lanceolate, one or two lobed. The flowers grow on long slender peduncles, and are of a creamy yellow or pale yellowish green, the buds drooping; the flowers consist of four ovate, spreading, thickish sepals, silky on the inside. From Chinese Tartary, and the Snowy Passes of the Western Himalaya, at 12,000 feet elevation. Introduced in 1844. Flowers in the summer. Horticultural Society of London.

Eriocnema marmoratum, *Naudin*. Marbled-leaved Eriocnema (*Revue Horticole*, ii., 381).—Nat. Ord., Melastomaceæ § Melastomeæ.—A curious dwarf herbaceous stove plant, probably perennial, remarkable for its chequered leaves. The stems are short, fleshy, resembling a tuber; the leaves oblong, oval, heart-shaped at the base, hairy, five-ribbed, on the upper surface bright green, marked with brown stains and broken streaks of white, and on the under surface rich purple. The flowers are rich rose-coloured, on a short bent spike terminating a scape about six inches high. It requires a hot, damp, shaded atmosphere. From Brazil. Introduced in 1849. Flowers in summer. Messrs. Henderson, St. John's Wood.

Eriocnema æneum, *Naudin*. Bronzed Eriocnema (*Revue Horticole*, ii., 381).—Nat. Ord., Melastomaceæ § Melastomeæ.—A very interesting dwarf stove herb, with ornamental foliage, and of a soft fleshy nature, resembling *E. marmoratum* in character. The leaves of this are dark greenish-brown or bronze colour, shining with a metallic lustre. The flowers are rather larger than in *E. marmoratum*, and grow in a scorpoid raceme. From Brazil. Introduced in 1849. Flowers in summer. Messrs. Henderson, St. John's Wood.

Niphæa rubida, *Lemaire*. Red-stalked Niphæa.—Nat. Ord., Gesneraceæ § Gesnereæ.—A pretty dwarf herbaceous perennial, with a short upright stem three to six inches high, furnished with opposite ovate-oblong somewhat cordate leaves, bluntly dentated at the margin; the stems and leaf-stalks are red. The flowers are numerous several from each axil—pure white, on peduncles three or four inches long; the corolla divided into roundish ovate, slightly irregular concave segments, the stamens and pistil deep yellow. Quite distinct from N. oblonga, and pretty when grown in a mass. From Guatemala; probably. Introduced about 1846. Flowers towards the end of summer and in autumn.

Macrostigma tupistroides, *Kunth*. Tupistra-like Macrostigma (*Ann. de Gand.*, v., 183).—Nat. Ord., Smilaceæ.—A curious stemless herbaceous plant, with a soboliferous rhizome, bearing solitary lanceolate striate-nervose leaves, on the short suckers, along with the solitary peduncles which, in the upper part, are furnished with many flowers in the form of a spike; the flowers are small, cup-shaped, flesh-coloured, having each a deep violet-coloured bract. From ? ——— Introduced to Berlin in 1847. Flowers ?

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ON THE THERMOMETER.

BY E. J. LOWE, ESQ., F.R.A.S., &c.

THE Thermometer is an instrument which shows us the temperature of the air. From it we have learned that all bodies, on being heated, expand (or become increased in volume), but each in a different proportion to each other; this expansion is but small in solid bodies, greater in liquids, and considerable in aeriform fluids.

Temperature plays a most important part in our atmosphere, and from experiments, we are able to point out the laws by which it is propagated and distributed; beyond this we cannot go, for we know not what modifications take place in bodies whose temperature is raised or lowered, but that portion which we do know concerning its laws, is of the greatest moment, especially to gardeners. We must, therefore, content ourselves until the time shall come in which further knowledge may be unfolded.

The Thermometer was invented at the beginning of the seventeenth century, by Dr. Drebbel, of Alkmaer, according to some, and by Professor Santonio, of Padua, according to others. The first thermometer consisted of a glass tube having a bulb at one extremity, the air in which, being rarified, the open end was plunged into a liquid; as the temperature of the tube increased or diminished, the air in the bulb expanded or contracted, and the liquid in the tube rose or fell; as this instrument was acted upon also by atmospheric pressure, its readings were without truth. From this early period various experiments were from time to time tried by Boyle, Newton, Amontons, Reaumur, Michelli, Fahrenheit, De Lisle, De Luc, Hook, Celsius, Sixe, Derham, Rutherford, Breguet, &c. Amontons substituted spirits; Fahrenheit, mercury; and Breguet did without either liquid or gas, his instrument acting by the unequal expansion of different metals.

The construction of the thermometer in present use, is a very small tube, terminating at one extremity in a bulb or reservoir, which is either filled with a liquid or a gas, mostly mercury. The liquid must not be mixed with air, and to accomplish this, it is strongly boiled in the thermometer, and when the air is expelled, the tube hermetically sealed. It was necessary that two fixed points should be found in order that the readings of one thermometer might be compared with another, and fortunately, this has been very satisfactorily done; for, under the same atmospheric pressure, all instruments plunged in pounded ice or melting snow, indicate the same point, viz., + 32° F., and all, if under the same pressure are exposed to the vapour of boiling water, indicate another fixed point, viz., + 212° F. (of course it is understood that these experiments are carried on at the level of the sea). These two points being found, the tube is divided into a certain number of parts, called degrees, which are also continued beyond the boiling and freezing points; in the latter case, after we have continued the divisions back 32° F. (*i.e.* reached + 0° F.) the degrees are numbered progressing backwards, as, — 1° F., — 2° F., — 3° F., &c, having the sign — (minus) prefixed; thus, — 3° F implies that the temperature is 3° below zero, or 35° below the freezing point of Fahrenheit's thermometer.

Unluckily, there is a complication attending the readings of the thermometer, which makes it difficult to compare various observations taken in different parts of the world, as several countries use a different scale; the English use the scale of Fahrenheit, the French that of Celsius (centigrade), the the Germans that of Reaumur, and the Russians that of De Lisle. The freezing point of Fahrenheit is + 32,° of Reaumur 0,° of Celsius 0,° and of De Lisle + 150.° The boiling point of Fahrenheit is + 212,° of Reaumur + 80,° of Celsius + 100,° and of De Lisle 0°; those who wish to reduce any one of these scales to another, will do well to consult the article "Thermometer," by James Glaisher, Esq., in the Illustrated London Almanac for 1849.

There are other thermometers besides those of which we have been speaking, which tell us how hot or how cold the air has been within any given time; these are called self-registering thermometers. Rutherford's construction is the best, as it is the least complicated, and consequently least likely to become out of working order; yet this contrivance requires two thermometers, and will even then only show us the extreme heat and extreme cold. The one to register the greatest degree of cold is filled with spirit, in which is placed a steel index, which when the spirit descends is carried with it, but when it again ascends is left behind. The other to register the greatest degree of heat is filled with mercury, which has a steel index not plunged in the liquid but placed above it; when the mercury rises this index is pushed before it, but when it again falls is also left behind. Thus on referring to the indices we at once recognise the greatest heat of the day or the greatest cold of the night. The first self-registering thermometer was invented by John Bernoulli of Basil; others have since been invented by Sixe, Rutherford, Keith, Blackadder, Traill, Lawson, &c. Of these many are now quite out of use, and we shall only pause to describe one which for ingenuity is not to be equalled; it was invented by H. Lawson, Esq., F.R.S., of Bath, and is one of a number of instruments working on the same machine, called the "atmospheric recorder," which amongst other registrations marks the temperature of the air every quarter of an hour, day and night. A quantity of thermometers (the tubes of which are bent in the middle, so that one half of each is at a right angle to the other half,) are placed on a balance to which is attached a long arm carrying a steel point; the balance is made to be at a given position at thirty-two degrees Fah., consequently a rise or fall of one degree in temperature upsets the balance and moves the arm either to the right or to the left, for a small quantity of mercury is either added in the one leg, being robbed from the other, or *vice versa*. A sheet of paper is made to move an inch an hour by clock-work across a table, over which is suspended this steel point, and a hammer in connection with the clock strikes the point every fifteen minutes into the paper, and consequently registers the temperature; all that is requisite being to wind up the clock.

The thermometer, an instrument so generally used and so generally useful, is but ill understood; yet how all-important is this little indicator to the cultivators of stove and greenhouse plants; it is true that but few plant-houses are without one or more of these instruments, on which implicit confidence is placed by their owners, who never doubt but that whatever temperature is indicated must be the true state of the atmosphere, yet unfortunately this is very seldom the case, the generality of thermometers are quite erroneous, and it is only by purchasing them from such opticians as Barrow, Watkins, Bennet, or Dollond that we may expect to arrive at the true state of the air. Even this is but one step towards obtaining a good instrument, for they must all be compared with a standard thermometer, which should invariably be found in the observatory of a practical meteorologist. We shall quote a few words on the subject from a small work recently published*:—"To a common observer all may seem perfectly right; and yet when examined by placing them by the side of standards they are sometimes found a few or more degrees too high or too low; or what is more unfortunate, frequently vary in the number of degrees of error in different portions of the scale." Instruments sometimes become after a time inaccurate by exposure to great variations of temperature, *i. e.* when plunged a second time into melting snow, do not point to thirty-two degrees F., but a little higher; careful meteorologists should therefore verify the freezing point of their thermometers every year. There is also a mortifying circumstance attending cheap self-registering thermometers; those for marking the greatest coldness are filled with bad spirits which soon become out of order; and those for registering the greatest heat are even worse, for they are not unfrequently filled with oxidised mercury, which will soon separate in half a dozen places, and the instrument is rendered useless.

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* *Prognostications of the Weather*, by E. J. Lowe, Esq., F.R.S., &c.: Longman and Co.

FANCY PELARGONIUMS.

Generic Character.—Pelargonium, *L'Heritier*. *Calyx* five-parted, the lobes sub-equal, the posterior produced at the base, and adnate to the pedicel, so *as* to form an adherent spur of variable length. *Corolla* five-, rarely by suppression four-, or sometimes two-petalled, inserted at the base of the gynophore, alternating with the lobes of the calyx, clawed, caducous. *Stamens* ten, inserted with the petals, coherent into a tube below, the alternate stamens opposite each petal shorter, on a barren filament; *filaments* flattened, membranous, subulate from a broad base, the posterior often more produced; *anthers* introrse, two-celled, incumbent, obtuse, dehiscing longitudinally, caducous. *Ovaries* five, oblong, adnate to the broader base of the elongated columnar gynophore, one-celled, two-ovulate; *ovules* ascending or suspended; *styles* filiform, distinct at the base, adherent longitudinally to the gynophore, contracted and coherent together above the gynophore, free at the apex; *stigmas* introrse, lateral. *Capsules* five, oblong, with tails consisting of the styles elastically separated from the columnar gynophore, one-celled, by suppression one-seeded, dehiscing by the ventral suture; *testa* crustaceous.—(*Endlicher Gen. Plant.* 6042).

§ Pelargonium.—Petals five, unequal, the two upper approximating. Stamens ten, unequal; seven fertile, the rest sterile, subulate. Soft-stemmed under-shrubs, or dwarf herbs, often with short, fleshy, bulb-like, underground stems. Natives of the Cape of Good Hope.

The cross-bred varieties so abundant in gardens, under the popular name of Geraniums, have sprung from this section. Of these, the "Fancy" Pelargoniums are a distinct race, which have been originated, by means of cross-breeding, within the last few years. They are characterised by a remarkably dwarf and free-blooming habit, by comparatively small flowers, and by the peculiar, often curious and striking, disposition of their colours.

Fancy Varieties.—1. *Ayres' Painted Pet.*
2. *Ayres' Formosissimum.*
3. *Ayres' Caliban.*

DESCRIPTION.—The great interest which has been taken, within the last year or two, in the cultivation of Fancy Pelargoniums, has rendered them very general favourites; so much so that, should the improvement continue, they will soon displace the show varieties in public estimation. It is true they want the boldness and brilliance of those varieties, but it requires very little improvement upon those here figured to make the Fancies very formidable rivals. The varieties here represented were raised by Mr. Ayres, nurseryman, of Blackheath, and are seedlings of the present season. Painted Pet has purplish crimson upper petals, suffused with violet, and a white belt, and the lower petals are spotted with purple and very distinctly marked or feathered with blue, the latter colour being more distinct than is general in this family of plants. The form of the flower, and the habit of the plant is good, and it is a most abundant blooming variety. For novelty of colour it must certainly become a general favourite. Formosissimum is a seedling from Formosa, of fine form, and admirable habit of growth. It has crimson upper petals distinctly margined with white, the lower petals spotted and pencilled with crimson. It is a flower of great substance, very constant, and certainly second to none in point of form. Caliban has also flowers of great substance and fine form, and the habit of the plant is excellent. The upper petals are rich plum-colour, belted with white, and the lower petals are spotted with rich mulberry. These kinds have not yet been offered for sale; neither will they be before June, 1851. For culture see vol. i., 5.—M.

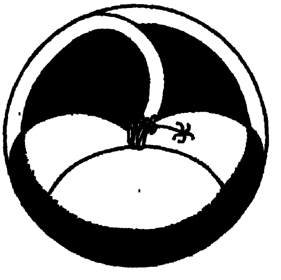


DIAGRAM OF A PERFECT FANCY PELARGONIUM.

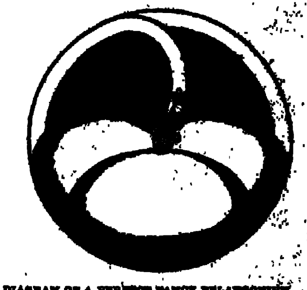


DIAGRAM OF A PERFECT FANCY PELARGONIUM.

THE PROPERTIES OF THE FANCY PELARGONIUM.

By Mr. G. GLENNY, F.H.S.

THERE is no doubt in our mind that the Fancy Pelargoniums will arrive at the point of perfection, as respects the circular outline, long before the Show Pelargoniums, for there is no concealing the fact that there is scarcely a single variety among the Show Pelargoniums that has not a much narrower under-petal than many of the Fancy kinds. These latter mentioned sorts have been for some time exceedingly ragged and frilly or puckered, and mostly very indefinite in their markings; but the present season has produced many very excellent flowers, which have exhibited the truss nearly perfect. There is, in fact, scarcely room for improvement in this important point. The great object now is to obtain decided colour and uniform markings, for, although we have given in the diagram of a perfect Fancy

Pelargonium an imaginary pattern, we by no means wish to infer that such a marking as we have given is to be the only perfection. Like the Pansy, the flower is capable of producing an endless variety, and all good, the principal object being uniformity. It is quite as good to have five petals alike, with a blotch or a spot in each, as it is to have the feather as we have depicted it; but it is absolutely necessary to produce flatness, roundness, and brilliance. Thickness of petal seems to have been achieved already in many varieties, but indistinctness and roughness seem to pervade nearly all of the very best.

We have always to keep in mind that the Fancy Pelargonium requires to be of dwarf habit and striking colour. One of the chief objects is, that it should be good for bedding out, and as the eye is not close to the bed, whatever is indefinite or deficient of colour is lost at the distance we are generally placed in as we walk round the garden. Scarlet is a striking colour alone, and the Fancy Pelargonium must be very well contrasted in colour to be worthy of a place. Suppose we had a variety with black markings on a white ground, the contrast would be as great as it is possible to produce; all colours, therefore, as they recede from black, get less striking as a contrast, but when we have brightness or denseness of colour well defined and properly abrupt, the flower cannot be other than desirable. The purity of the white is everything as regards the colour, for if the colour be faint so that it be well defined, it is, to some extent, a contrast. Cloudy and shady grounds are bad, anything that is indefinite is bad; the most exquisite shape would be useless if there were not distinctness in the marking. A pale rose feathering on the under petals, or a distinct spot on each, or a flower with the upper petals of a deep colour, and the under petals white or pale rose, would be admissible; and so would any other kind of marking, instead of those we have given; if plain and distinct, it would be equally esteemed perhaps, for it is in the colour and markings that the value must now be estimated. There cannot be a better mark of novelty than a colour which we have not obtained, but it must not be a mere dab of colour here and there, nor must it be cloudy, or shady, or indistinct. The figures of the three varieties which are given with the present number, present us with little gems in their way, but the artist, who has not been aware of the little points which tell so much one way as the other, has evidently considered that the actual form of the flower was of less consequence than it is. Artists in general attend a good deal more to the picturesque than to those nice points which make a flower good or good for nothing. There is, for instance, an unnatural curl in the upper petals of all, they might have been all drawn from one flower for all the difference we can see in the shape or make, and yet when we saw these flowers we considered them very different in their forms however good they are; those, therefore, who buy the flowers from the drawings, will be agreeably disappointed with the bloom of the flower, for they are a much better shape than they are represented. If we were inclined to write the properties of the Fancy Pelargonium over again, we should be very apt to quote the properties of the Pansy, because we suspect they are to be realised in the flower before us. The under petals should be uniform, the colour bright or dense, the marking distinct, and the ground colour pure; the petals thick and of fine texture, *the edge free from puckering, notching, or frilling*; the flower perfectly round, the footstalks long enough to enable the flowers to expand and touch edge to edge without lapping over. There should not be less than four flowers on a truss; the bloom should be continuous; the plant short jointed; the foliage small and clean; the habit dwarf and bushy; the flowers thrown up above the foliage and very abundant. Beyond this all is fancy; whether the flowers be spotted, or feathered, or blotched, the three lower petals should be uniform and the two upper ones alike, and we have seen all this realized, or as nearly so as may be; and certainly the other kinds of Pelargonium, that is to say those shown for prizes so many years, are unquestionably behind the Fancy ones, which three or four years ago were hardly worthy of a place in the garden, for they were puckered and frilly, rough on the edges, indefinite in their colours and markings, and otherwise ill-formed. We rejoice in their advance, for it shows what can be done when the florist is determined to improve a flower. We are not quite sure that the Show Pelargoniums have advanced the last two or three years; there is a great sameness. Perhaps two of the three figured some time ago are the most decided novelties of late production; the one for its rich purple colour, the other for its very remarkable spotting. Ocellatum is, in fact, a Fancy Pelargonium to all intents and purposes, but it is in all but its peculiar marking, a Show variety; so peculiar, however, is the spot on the three lower petals, that we should hardly think it safe to use if we were showing half a dozen; it is impossible to divest one's-self of the notion that it is a bedding-out variety. It is not only in point of form of the flower and colour, that the Fancy Pelargonium is improving so much, but we have several already which have sweet foliage, and we see no reason why a class of sweet and fancy-foliaged varieties should not be raised. We saw, the other day, a small plant, a cross between Anais and one of the Cape species, which had Oak leaves and a very neat dark blotch in the centre of each leaf, and should this marking be constant the plant will form the basis of a class of fancy-foliaged Pelargoniums.

PENDENT OR WEEPING TREES.

By Mr. P. F. Keir.

In all kinds of scenery connected with the garden or field, few objects are more pleasing and striking than handsome weeping trees. Whether their branches are seen to kiss the lake or murmuring brook, or droop in mourning mien over the lonely tomb, their gracefulness and beauty are readily felt and acknowledged. In the extended landscape of mountain, stream, and plain, or even on the lawn of more circumscribed limits, the general effect of weeping trees, when tastefully distributed, is highly picturesque and ornamental. Much skill and taste may be expended in arranging and grouping trees of upright habit, but no other objects so effectually impart an air of completeness or *finish*, as the gracefully pendent boughs of the weeping varieties, such as the Willow, the Ash, and the Elm.

But beautiful and desirable as weeping trees undoubtedly are, no experiment to increase the number of varieties has as yet been successful. The vulgar notion that the grafts of upright growing kinds assume the pendent habit by merely being inserted in a downward position, has long been favourably entertained among the inexperienced in horticultural affairs. But such a notion is, of course, founded in extreme error, since nothing can be more at variance with all known facts bearing on vegetable physiology, as well as skilful practice. The fact is, in this matter, the horticulturist has no resource. Among the innumerable expedients incidental to his profession, no one he can employ, no scheme he can devise, has yet enabled him to surmount this difficulty. Amidst the profundity of learning and the assiduity of research, it must still be admitted that the origin or production of weeping trees is regulated and determined entirely by the ordinary laws of chance. To the physiologist nothing is more inexplicable, and perhaps nothing among the "vital phenomena" of vegetation has been less studied.

And yet, notwithstanding the odds against which we have to contend, it is gratifying to find that the number of varieties of weeping trees has been considerably increased within the last few years, and that the character of those which have been introduced to cultivation is of no trivial description. Were the different varieties now known to be compared with each other, it would, perhaps, be found that the Ash, the Elm, and the Willow had suffered no depreciation by the introduction of others which have been later raised. But, indeed, a weeping tree is so graceful and beautiful, that it must, when well grown, command admiration whatever may be the genus to which it owes its parentage.

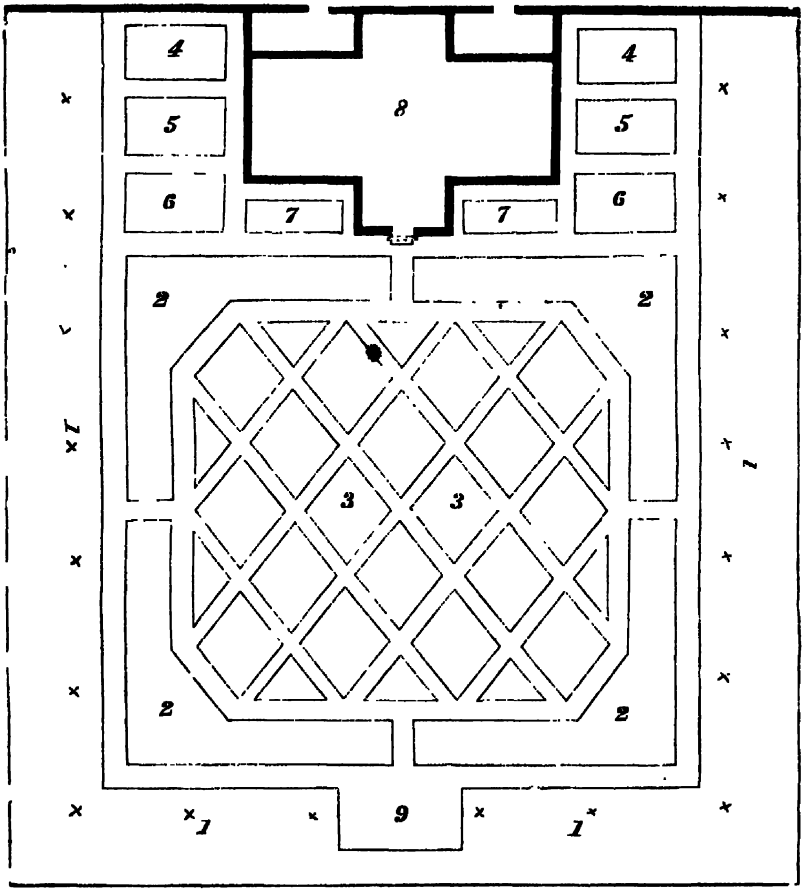
It would be interesting and instructive to investigate the degrees of that perpendicular tendency which constitutes a perfect weeping tree. It is scarcely to be denied that there is a wide distinction between those whose strong shoots turn towards the ground as soon as they are a few inches in length, and such as assume the weeping form simply by the branches being gradually bent down by their own weight at the extremities. Of the former, the Oak, the Holly, the Ash, and the Elm, may be cited as examples, while the Willow, the Birch, and one or two others, represent the latter. Not that I think that the Willow is less a weeping tree than the Oak; but in the one case the greater tenuity and length of the branches are more likely to be favourable to the drooping form than their robust strength in the other. The general effect is the same; the cause or process by which it takes place appears to be different. In support of this view it may be observed that there are many trees not classed among those having a weeping habit, which, owing to the tenuity and length of their branches, are capable of being easily trained to assume as pendulous a form as the weeping varieties of the Oak, the Elm, or the Willow. I have seen a tree of the common Thorn (*Cratægus Oxyacantha*), which, having been trained on a single stem seven or eight feet high, and the upper shoots kept short, finally assumed the true weeping form, or, at least, a very close approximation to it. Other varieties of the same beautiful genus—such as C. Oxyacantha laciniata, eriocarpa, melanocarpa, Azarola, and salicifolia, have all, more or less, a branching, spreading, or sub-pendent habit; and, in many cases, we find their shoots take a positively perpendicular direction. In the American nursery of Mr. John Waterer, Bagshot, there is a handsome tree of Pinus Douglasii, fully twenty feet in height, and the branches of which whether by their own weight, or by a natural tendency towards the ground, droop as completely as those of the Weeping Elm. It may be further observed, that even shoots of the Funebral Cypress only begin to turn downwards after they have attained a certain length, as if requiring the force of gravitation to give the appearance so much admired. Now, in the case of the Weeping Holly, there is a positive downward tendency of the shoots, as soon as they are a few inches long; while, contrary to the tenuity we find in those of the Willow and Cypress, they are vigorous and thick enough to grow erect for several feet if it were conformable to their habit.

From this view of the subject I am led to infer that some trees assume the weeping form, in a great measure if not entirely, by the weight of their branches, which are too soft and slender to grow upright, while others, from some unknown cause or action of the sap, naturally incline downwards, even though vigorous and strong.—K

A PLAN OF A DUTCH GARDEN AND GREENHOUSE.

By Mr. JOHN COX, Gardener to W. Wells, Esq., Redleaf.

THE subjoined plan is a modification of the ground plan of the Dutch greenhouse and garden at Redleaf; and as it affords many facilities, not only for the production of effect, but also for a great diversity and choice of plants, it has occurred to me as being an eligible subject for the *Magazine of Botany*. The chief interest, and indeed beauty, of these kind of gardens, is peculiarly intrinsic; they possess no features by which they can be moulded into a combination with natural scenery, and, therefore, are only appropriate as accompaniments to architectural embellishment; or to be placed in some warm secluded nook, where the boundary (to be presently remarked upon) may legitimately form a portion of the general scenery, without offending the taste by placing the extreme artificial in juxta-position with the purely natural. The form of the boundary, marked in the plan No. 1, must be determined by circumstances. If only a square plot is to be operated upon, and the exterior is of no moment, it may be a border bounded by a conservative wall for choice climbing plants and Roses; or, if room will serve, it may be a low wall, with iron palisading, and the border planted with evergreen and deciduous shrubs; but, if it is placed in any part where a formal boundary is inadmissible, I would have it formed of Azaleas, Andromedas, Rhododendrons, and other American plants in combination. The interior line being, of course, quite straight, the exterior may be varied in a multitude



A PLAN OF A DUTCH GARDEN AND GREENHOUSE.

of ways by indentations and projections, so as to appear part of a general design, and in keeping with surrounding scenery.

In order to assist the effect of this boundary, it would be as well to throw up a mound of earth suited to the growth of American plants, and by planting some large specimens on the top, some of which should be standards, and filling up the intermediate spaces down to the ground level with evergreens and deciduous shrubs intermixed, an appearance will be produced which it would take many years to arrive at, if the plants were all started from a level surface.

Near the interior line of the outside border I have placed crosses (×) at intervals where the taste of many persons might lead them to approve of a plan which would produce an unique and fine effect, viz., to plant at each × a strong-growing climbing Rose, to be trained up a pole twelve feet high, and when they reach the top to be guided across by means of a strong wire so as to meet each other, they would thus form a beautiful living festoon. Near this interior line also, the Chinese Pæonia Moutan, and varieties, should be liberally distributed; a sheltered situation of the kind suits them well. The beds, No. 2, may be filled with choice herbaceous plants, to be assisted during summer with plants from the greenhouses and pits. Double White Rockets are very conspicuous in such a situation in spring, so also are the Herbaceous Phloxes in summer. Conspicuous showy plants of such kinds will require a certain degree of uniformity in the arrangement to be in keeping with the artificial character of the garden. No coarse or common plants should be admitted. The interior octagonal portion of the plan (No. 3) may be devoted to bedding plants in masses, in the summer and autumn, and for the reception of the several plants mentioned in my article on Spring Decorations, (see vol. i., p. 222,) during winter and spring.

No. 4, Beds of hardy Fuchsias.

No. 5, Beds of Roses.

No. 6, Choice plants from stores, with some ornamental trellises covered with Lophospermum, Maurandya, Tropæolum, and other rapid growing creepers during the summer, and Hyacinths in spring.

No. 7, Bright dwarf Scarlet Geraniums in summer, Turban Ranunculus in spring.

No. 8, The greenhouse. This, of course, as well as the whole plan, may be varied and modified so as to suit particular circumstances; as, for instance, instead of a greenhouse the garden might be formed in front of a cottage ornée; taste will easily suggest a different arrangement; only the style must not be departed from, and neither circles nor curvilinear figures admitted.

No. 9 Affords an excellent situation for a small architectural temple, where seats may be arranged, or it may be formed of rustic woodwork, and covered with Roses, &c.

In a garden arranged according to the above routine, there will be, except in severe frost and snow, some objects of interest, in flower all the year round; whilst, at certain times of the year, the effect will be truly gorgeous.

Lastly, with regard to the formation of the walks and borders, I must observe that the walks here are formed of paving bricks laid flat, and the edges with a smaller brick set up end-ways; and it affords a dry and comfortable walk all the year round, which is a great desideratum; but they may be formed with gravel and edged with box or slate, or whatever the taste may fancy, except grass, which, in such a situation, would be as inappropriate as it would be difficult and troublesome to keep neat.

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CARNATIONS AND PICOTEES ON CARDS.

By Mr. J. T. NEVILLE.

IT has been the custom to dress and prepare the blossoms of these flowers on collars of paper, or thin cardboard, so long as the memory of the oldest cultivators of the present day will serve them; even to a more remote date it may be traced that the same treatment was practised with the old crimson Clove, and other varieties in cultivation at the latter time. Miller, in his Gardeners' Dictionary (second edition, 1733), when alluding to the bursting of the pods of Carnations, &c., says, "At this time also, or a few days after, as you shall deem necessary, you should cut some stiff paper, cards, or some such thing, about four inches over, and exactly round, cutting a hole in the middle of them about three fourths of an inch in diameter for the pods of the flower to be let through, and when your flowers are fully blown, if you cut them off, you should put on a fresh collar of stiff paper cut exactly the size of the flower," &c., &c.

Thus far it appears the custom of carding the blossoms of this class of flowers, has existed upwards of a century. It must also be remembered, that it has been usual at all Floricultural exhibitions, to withdraw the cards prior to the judges deciding on the merits of seedlings or collections submitted to their judgment, whether in stands of twenty-four, twelve, or six blooms; and, after such decisions, the exhibitors to replace the cards. The motive for removing the cards for the judges' decision, is, it will be understood, that they may have an opportunity of ascertaining the full character of the flowers; as one of the most important properties is, that the lower row of petals, or guard leaves, as they are termed, should be sufficiently stout to retain themselves in a horizontal position, or nearly so, and support the upper part of the flower without any artificial assistance. Of late it has been proposed to do away with the custom of removing the cards for the censors. It has been said that the task of uncarding and recarding twenty-four blooms, before and after judgment has been passed on them, is tiresome, and occupies too much time. The subject has given rise to much discussion, and a difference of opinion still remains. As far as I have been able to learn, there has been no argument introduced to convince one of the propriety of departing from the old wholesome system; on the contrary, I think the censors should have a fair sight of the flowers unclothed, without having to remove the cards from suspected blooms, which circumstance alone might lead to many quibbles, and much dissatisfaction among the exhibitors. Be this as it may, it is evident to all, that loose, flimsy petalled flowers, look well supported by a card, and, therefore, the system of judging them on cards would allow of many inferior flowers taking their stand among their superiors, and thus tend to render the science less interesting.

Though I do not suspect my brethren of tricks, such as have come to my knowlege in times past, I do think the proposed system of exhibiting open to many objections. If the extra trouble of arranging twenty-four blooms is too much for the dealers, they may probably come to some arrangement among themselves to exhibit their collections off cards altogether, and save all the labour. Purchasers could not object to this plan, as it would give them an excellent opportunity to select for their own stock. Members of Societies will do well to discuss this subject during the winter months at their meetings, and determine on the most beneficial, and approved mode, of exhibiting Carnations and Picotees for the year 1851.

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DUTCH BULBS AS ORNAMENTS FOR THE CONSERVATORY.

BY MR. M. SAUL, GARDENER TO LORD STOURTON, ALLERTON PARK, YORKSHIRE.

BULBOUS-rooted flowering plants are at once numerous, conspicuous, and exquisitely beautiful; they are gorgeous members of both the greenhouse and the parterre; and were all other plants annihilated or forgotten, this class alone would fill the hearts of the most enthusiastic florists with delight, and be an ample memorial of the floral glories of Paradise. The "lilies of the field," the Amaryllises, Tulips, Hyacinths, Jonquils, Crocuses, and many others, are familiar examples of the combined magnificence and loveliness of this class of plants.

Bulbs have many different properties to recommend them to us; some, as those of many species of Allium, are used for culinary purposes; others, as certain kinds of Scilla and Colchicum, are used in medicine; and an enormous number of them enjoy peculiar care and brilliant reputation in the healthful, charming, and fascinating art of floriculture.

I do not at present intend writing an essay on bulbs in general, but merely to offer a few remarks on what are called Dutch Bulbs; such as Hyacinths, Tulips, Narcissuses, Jonquils, and Crocuses; this being the season of their annual importation. On Hyacinths I can offer nothing better than has already appeared in this work; but hope my remarks on the other bulbs may assist amateurs and others in obtaining a good display of flowers during the winter.

These charming plants are invaluable as decorative objects during winter both for the conservatory and drawing-room, as with a good collection of them we can have them as gay and lively as we wish. They are peculiarly attractive, as well for their fragrance, as for the delicacy, brilliancy, and variety of their colours.

To flower bulbs successfully, they should be procured as soon after their arrival in Britain as possible, and be potted immediately in a soil composed of decayed leaves, maiden loam, and cow-dung, with a little river sand. Besides this, another essential to their flowering well, is the condition of the bulb; for, if the bulbs have been properly matured, there will be little difficulty in getting fine flowers; and this will, of course, depend on the season in Holland. The only thing we can do, is to get our bulbs from a respectable tradesman.

In potting Hyacinths, we do not bury the entire bulb in the soil, but keep the crown of the bulb level with the rim of the pot. We put one bulb in each pot, and for general forcing, use four inch pots, as in these they easily fit into vases for the drawing-room. When not wanted for this purpose, and to flower late, we use larger sized pots. Narcissuses, we generally put one bulb in a pot, using the same size for Hyacinths, and for the same reason. We mostly put three or four of the Van Tholl and Florentine Tulips in a pot; the other kinds we pot singly. We also put three or four bulbs of Jonquils and Crocuses in a pot. When all are potted, place them in a cold frame and plunge them in old tan, covering them with the tan about two inches thick.

The soil, when used, should be in a fit state for potting; that is, neither too moist nor too dry. If it has been in this condition when used, and the pots are plunged and covered as we have just mentioned, the bulbs will in a short time fill the pots with roots, a fine bloom will easily be secured, and they will not require any water until they are taken into the forcing-house. The lights should remain on the whole time they are in the frame; and, in very severe weather, a little straw or other covering should be put over them.

The flower stems of the early kinds will soon heave up the tan, so that the inexperienced will have little difficulty in knowing which to introduce into the forcing-house. Bulbs do not require a very high temperature to bring them into flower. We begin with Van Tholl Tulips and Double Roman Narcissus, which we get into flower about the end of October; after them comes the Tournesol Tulips, and Soliel d' Or Narcissus; and after them the other different kinds. The early flowering Hyacinths we put into the forcing-house in November, so as to have them in flower at Christmas, thus we manage to have a regular succession of flowers during the whole of the winter. We find it an excellent plan to invert a flower-pot over the Hyacinths for a few days after they are introduced into the forcing-house; and they should be turned occasionally to insure fine handsome symmetrical spikes of flowers. Bulbs in general should have a light airy situation, and be watered pretty freely.

A good collection of Hyacinths should be procured as soon after importation as possible, and of Narcissus, Tulips, and Jonquils, the following kinds, which I strongly, and with confidence, recommend to amateurs:—

NARCISSUS:

Double Roman, the best for early flowering.
Soliel d' Or, comes in after the preceding.
Grand Monarque, very fine.
States' General, excellent.
Bazelman Major, in my opinion the very best.

TULIPS:—

Double Van Tholl, good for early forcing.
Tournesol, comes into flower after the former.
Marriage de ma fille, pretty.
Rex Rubrorum, fine.
Royal Standard, good.
Sweet-scented Florentine, exquisite, on account of its delicious fragrance.

JONQUILS:—

Fine large double, } both very good for forcing.
Single sweet scented, }

With these the conservatory and drawing-room can be made gay and cheerful during winter. The number of bulbs will, of course, entirely depend on the quantity of flowers wanted.

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Review.

A Synopsis of the Coniferous Plants, grown in Great Britain, and Sold by Knight and Perry, at the Exotic Nursery, King's Road, Chelsea. London: Longmans. 8vo., pp. 64.

THIS little volume, elegant in external appearance, and well arranged as to its contents, combines within itself the several features of a nurseryman's catalogue, a cultivator's manual, and a monograph of the order Coniferæ; and what is more, each of these is executed with becoming skill. Though ostensibly a nurseryman's trade list, and as such deserving of encomium for its completeness and advance upon the generality of such lists, and for the care bestowed on its preparation, the little *brochure* before us takes, in fact, a much higher rank in horticultural literature; and to those who desire to become acquainted with the interesting and valuable order of Conifers, as they are at present known, Messrs. Knight and Perry's Synopsis may be recommended, as an accessible and trustworthy guide The authors tell us that, having for many years recognised Conifers as the most important of our hardy trees and shrubs, on account of their ornamental character and valuable produce, they have given much attention to their cultivation, and have succeeded, by great efforts, in forming probably the most complete existing collection; that the object of *preparing* the Synopsis has been to produce a correct enumeration of such as can be purchased in this country, the want of such a guide having been often pointed out; and that they have taken much pains to make it as complete and as accurate as possible. They also mention, in self-justification, that the catalogue was prepared before the appearance of the first part of an excellent and very complete catalogue of Coniferous plants, recently published in the *Journal of the Horticultural Society*, but circumstances occurred which prevented its being printed.

We proceed with a brief sketch of what we find before us. There is first a few introductory pages, in which and in a condensed form, the general distinctions of the families, some of the most important facts respecting their distribution, and their economical and ornamental application, and a few special points of culture are enumerated. Then follows the Synopsis, in which the authors lay no claim to originality in their botanical views, the arrangement of genera and species adopted, differing, as they tell us, very slightly from that given by the late Professor Endlicher, in his valuable *Synopsis Coniferarum*. The genera and their arrangements are as follows :—

I. CUPRESSINEÆ.—1. *Juniperineæ :* Juniperus, *Linn.* 2. *Actinostrobeæ :* Widdringtonia, *Endl.* ; Frenela, *Mirb.* ; Callitris, *Vent.* ; Libocedrus, *Endl.* 3. *Thuiopsideæ :* Biota, *Endl.* ; Thuja, *Linn.* 4. *Cupressineæ veræ :* Cupressus, *Linn.* ; Chamæcyparis, *Spach.* 5. *Taxodineæ :* Taxodium, *Rich.* ; Glyptostrobus, *Endl.* ; Cryptomeria, *D. Don.*

II. ABIETINEÆ.—1. *Abietineæ veræ :* Pinus, *Linn* ; Abies, *D. Don* ; Picea, *D. Don* ; Larix, *Tourn.* ; Cedrus, *Barr.* 2. *Araucarieæ :* Araucaria, *Juss.* 3. *Cunninghamieæ :* Dammara, *Rumph.* ; Cunninghamia, *R. Br.* ; Sequoia, *Endl.*

III. PODOCARPEÆ.—Podocarpus, *L'Herit.* ; Dacrydium, *Lol.*

IV. TAXINEÆ.—Phyllocladus, *L. C. Rich.* ; Salisburia, *Smith* ; Cephalotaxus, *Sieb. et Zucc* ; Torreya, *Arn.* ; Taxus, *Linn.*

These genera are then treated separately, first in some general introductory remarks on their character and uses ; secondly, in special remarks on the hardiness, habit, or other characteristics of such of the species as require particular notice ; and, thirdly, in a tabular arrangement of all the species and their varieties, which table, besides the adopted name, gives at one view all the synonymes, the popular names, the native country, and the height in feet. There are appended a few general remarks on the culture of Coniferæ, and a very useful, because complete, Index, including all the systematic and English names, as well as the synonymes. These particulars, though brief—and we do not extend them, because all who are interested in the subject, will not be content with any sketch our space may admit—justify us, as the more ample contents of the book itself most certainly do, in asserting that the little volume before us fully carries out its professed object, that of furnishing intended purchasers with a safe guide, in ascertaining the kinds which are suitable for planting under particular circumstances. As a convenient list of reference for the nomenclature of the most important group of hardy trees and shrubs, it will have a still more extended use. M.

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SULPHURATING MACHINE.

AMONG the many instruments essential to the proper management of a garden, this invention by Mr. Fry promises to be one of the most useful, alike indispensable to the cottager as to the manager of the largest establishment. Through the kindness of a neighbour, we have had an opportunity of trying some experiments with the machine, and we find it admirably adapted for the purpose intended, as well as for fumigating with tobacco. It is manufactured on the principle of Brown's Fumigator, the sulphur being drawn into a box by means of a fan, and distributed through a tube in a continuous cloud. With this instrument, a row of Peas, a score of Heaths, a frame of Cucumbers or Melons, or a house of Vines may be covered with sulphur in a few minutes, and that not in superabundance in one place, and none in another, but it is equally distributed like fine dust, and so as not to be offensively perceptible on the plants. Sulphur, and more especially sulphur vivum—the waste, is very cheap, if bought at the manufactory; and we have reason to believe that the Hop growers of Kent intend to avail themselves of this machine to destroy the mildew upon the Hop plants. It is necessary that the machine as well as the sulphur be perfectly dry when used, or it is liable to clog. For distributing snuff to destroy the Aphis on wall trees, and also for quick lime for the Turnip fly, this machine might be used with advantage.

It is true, we have not been in the habit of using sulphur so extensively in garden management as has been necessary ; but now we have got this machine, and know at the same time sulphur sufficient for the supply of a large garden may be purchased for a few shillings, we see no reason, why Peach trees, Peas, and many other crops should be allowed to draw out a miserable existence, when the enemy that kills them can be destroyed by a few puffs of this instrument. One of the best flower gardeners in the country, Mr. Beaton of Shrubland Park, uses sulphur among his flower beds, as Verbenas, Calceolarias, &c., to destroy the mildew, which upon some kinds, late in the autumn, is very troublesome; and we have no doubt he will regard this machine as a perfect boon to him, as will every other gardener who procures it. With it, all the beds in an ordinary flower garden might be dusted in less than an hour, and without being rendered unsightly, as they must be when sulphur is thrown upon them by the hand.

When used as a fumigator, the tobacco is placed in a vase provided for the purpose, which can be attached to the machine in a few seconds, thus there is no chance of the ignition of the sulphur, or the generation of sulphurous acid gas, which is so destructive to vegetable life, and which is so much dreaded by some gardeners who do not know the machine. In fumigating, this machine discharges the smoke much colder than Brown's instrument, as a portion of cold air is drawn into the tube and mixed with the smoke with each revolution of the fan.

The only fault we have to find with it is, that it is not manufactured sufficiently strong, but when properly made, we doubt not, it will last for a number of years. It can be procured from Mr. Fry, gardener to Mrs. Dent, Manor House, Lee, Kent.

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A GLANCE AT MODERN FLOWER-GARDENS.

By Mr. R. Errington, C.M.H.S., Gardener to Sir Philip Egerton, Bart.

LIKE everything else in the world of fashion, modes of flower-gardening come and depart, but only on the condition of a revival in one form or other at some future period. In former days we had our herbaceous and mixed beds and borders, chaotic enough, to be sure, in many cases, but which when kept in high dress—the flowers well arranged and well selected—possessed great interest. It was the character of very many of the herbaceous tribes, however, to become crowded and exhausted; and such families as Phlox, Aster, Monarda, Delphinium, and other free-growing and robust plants, were not unfrequently to be seen choking their delicate neighbours; the competition was too severe for such graceful and delicate things as the finer Gentians, Aquilegias, Camassias, Catananches, Lychnises, Sisyrinchiums, Dracocephalums, Gnaphaliums, &c., &c.

Here there was a continual groundwork of dissatisfaction; the country gardener who was short of manual labour, and whose spring work pressed too heavily, would, instead of parting, spring dressing, and re-arranging these things every season, pass them by, merely digging through them; this had at all times the effect of extirpating the finer kinds by a twofold action—thus: a clumsy labourer would in the dormant season, destroy gradually all the superior kinds, whilst the same act would give unbounded liberties to those of grosser habit; which, of course, by their coarseness and increase, soon destroyed all idea of proportion—that great essential of beauty, but which is still too imperfectly appreciated. Now, in spite of these sad defects, which attached themselves so much to the mixed flower beds or borders, I for one can look back on well kept borders of former years, which (if memory be faithful) gave as much satisfaction as our gorgeous self-coloured masses. To be sure, the eye had not become habituated to that glare of brilliancy, arising from hosts of Geraniums, Verbenas, &c., congregated together; the desires of the eye having become thus enlisted, must of course be kept satisfied; nevertheless it is well to examine into this case occasionally, and to see whether some of the features of the flower-gardening of former days might not be made to combine with the massing or clumping system.

It will, perhaps, be fancied at the outset, that I am about attempting to throw entire discredit on the massing system; before I conclude, it will be seen that such is by no means my intention. It is almost unnecessary to observe here, that figure and colour are two simple terms, which express very nearly all the beauties of the parterre. Of course, colour must be placed first on the list, for without this the plot would cease to be a flower-garden; no amount of elegance of form, or beauty of outline, can compensate for the want of this.

Nevertheless, it must, I think, be confessed, that form—whether individual or collective—and general outline, are too little heeded; and herein, as I conceive, lies one of the principal faults in modern flower-gardening—a fault to which the massing or clumping system is peculiarly liable. As to individual form, I would suggest that no amount or mode of planting of such things as Scarlet Geraniums, German Stocks, German Asters, &c., alone in beds, can ever produce that light and free outline, which is, and ever will be, a great essential of beauty in any given mass. Plants, whose individual character is that of flat-headed, can never accomplish this of themselves; and herein lies a fact which would seem to invalidate the principle of massing, when confined to *one kind* alone.

If such be admitted, the question arises, how is this to be amended, for he who is anxious to pull down, should be prepared to build. Now, I must confess that I am not at all desirous to repudiate the benefits arising from a judicious use of the massing system; or, in other words, that mode of using colours in the parterre, by which such striking and glaring effects are produced; for a thing in these days is little heeded, unless it is what may be termed striking.

In the first place I would inquire, why—even admitting the massing system to be the only one—why, I say, a bed *must be* composed of flowers of *one kind?* Although it may not be desirable to introduce a host of colours, harmonious or contrasting—such as prevailed in the mixed beds of former days—why not use two, three, or half-a-dozen kinds, as the case may be, in order to carry out a proper expression in point of form, together with elegance of outline; and this, too, without any sacrifice in point of colour, and thus a uniform blaze of one shade be exchanged for a judicious relief? Thus, in a bed of Geraniums, we frequently find such kinds as the Tom Thumb, or other scarlet, alone. No relief, no edging. Here we have a mass, rich indeed almost to satiety; still there is no elegance in their collective form, or *contour*, as the French have it These are all flat-headed things; and as to individual figure, they would be despicable without flowers. Now, if some of the taller carmine kinds, such as Mr. Beaton's Cherry Cheek, were introduced among them, and an edging or distinct band of some other plant placed around them, such, I say, would be the sort of relief I would propose. The edging, as far as colour was concerned, might be either a pale scarlet, a white, or an orange. Zauschneria, White Verbena, or the Chrysesis compacta might do, pegged down, and not suffered either to touch the exterior, or to infringe on the other portion of the bed.

Speaking of bad forms leads me to offer a few remarks on the ill effects produced by clumsy, flat-headed, and ponderous-looking plants in general, especially in the mixed beds or borders. Proportion, it will be admitted, is a point not to be entirely lost sight of. But how often have we found a huge Pæony, Rudbeckia, Pulmonaria, Funckia, Hemerocallis, Helianthus, or coarse Solidago, pressing down their weaker neighbours, and destroying all idea of proportion and high dress; they, moreover, so exhaust the soil for a considerable distance, that no choice plant can thrive near them; and the consequence is, they stand as greedy monopolists, not seeming to have any proper relation to the rest of the bed.

Such things as these are much fitter to form a transition scene, or an episode, in somewhat extensive grounds, for indeed they are totally unfit for the modern parterre, yet of eminent service elsewhere, from their bold expression. It not unfrequently happens, that a connecting link is necessary in our larger places, between the parterre or dress gardens, and the ordinary pleasure grounds; or in other words, between the choice flowers and the shrubs. Here, then, may all those robust and gigantic herbs find a place, principally in the fore-ground; whilst bold masses of Hollyhocks, Dahlias, &c., might be placed behind. And here such gigantic things as the Erythrolæna conspicua, the Bocconia, or rather Macleaya cordata, the Heracleum giganteum, the Ferula tingitana, the Ricinus communis, or Caster-oil Tree, &c., &c., these, with huge clusters of our larger Phloxes, Delphiniums, Veratrums, Funckias, Rudbeckias, Papavers, Helianthemums, Aconitums, Sun-flowers, Pæonies, &c., &c., would find a fitting situation. Thus might the dressy portion of the flower-garden be relieved, without losing or discarding these noble herbs, which are capable of imparting an amount of dignity and expression to pleasure grounds unpossessed by any other plants.

I do think, therefore, that those entrusted with the laying out of pleasure grounds, should make a point of specially reserving a site for such things; and thus, at any time, a plant considered too coarse for the dressy parterre, might be at once transferred to such a situation. To this hour, in the majority of country places, it stands a problem, what to do with the grosser herbaceous tribes, many of them too good to be totally rejected.

THE GARDENERS' AND NATURALISTS' CALENDAR FOR OCTOBER.

FLOWER GARDEN—IN-DOOR DEPARTMENT.

Conservatory.—The time has now arrived when greenhouse plants must no longer be trusted to the tender mercies of our fickle climate, and if not already done, no time must be lost in getting them into their winter quarters. Before, however, they are taken in, attend to previous directions, and see that the plants, pots, and stages are perfectly clean; as nothing tends so much to the propagation of insects and filth as dirty and imperfectly ventilated houses. In arranging the house, take care not to crowd the plants, as it will be better to throw a *few inferior* specimens away than to run the risk of injuring one good one. A few nicely grown specimens are very preferable to a forest of indifferent plants, and are calculated to impart more real pleasure to an intelligent observer. Some of the more forward of the Camellias will now begin to expand, (we have had plants in bloom for the last three weeks) and some of the late Orange trees will be throwing a second bloom; place these in prominent places so that they may be properly seen. Distribute the flowering plants tastefully about the house, and take care to keep it scrupulously clean. Ventilate very freely both night and day, so as to prevent the plants being drawn, should the weather continue mild; and water when necessary.

Orangery.—As the growth of the plants will be completed, attention must be paid to maturing the wood and also the fruit. Syringe the plants lightly about twice a-week, and guard cautiously against insects Where the young fruit is too thick, some of it must be removed.

Forcing House.—A few plants, as noticed below in the plant stove, may be introduced into this house, and the plants of Salvia splendens, prepared for winter blooming, may also be gently forwarded here. Towards the end of the month some of the first potted bulbs, as Tulips, Hyacinths, and Double Roman Narcissus, may be introduced for the first crop. A.

Orchid House.—Let there be no lack of attention to former directions, and now discontinue shading; but should you have very strong sunshine be more libera in giving air. Discontinue the use of the syringe to great extent, and ply it only on such plants as are making strong growth. Look well to those plants growing on blocks or in baskets; see that they do not suffer for want of the proper elements of constitutional vigour, and let not a day pass without thoroughly examining all the gems of the collection—such as the noble and beautiful family of Dendrobiums, the gorgeous and lovely Aërides, Vanda, and Saccolabiums; also the charming plants Chysis aurea, and bractescens, and the magnificent Lælias and Cattleyas. Nearly the whole of these are in full growth, and by proper attention for the next few weeks in particular, very much may be accomplished. To do this, a good moist atmosphere must be maintained of from sixty to seventy degrees fire-heat. Give assistance where necessary to all growing shoots or leaves, in order that they be in the most effective position, and do this neatly.

Stove.—In order that this house may be as interesting at Christmas as it is in June, let no time be lost in paying due attention to the following list of plants, and give at once a final shift to such as need it:—Aphelandra aurantiaca, Justicia speciosa, lanceolata, and carnea, Begonia coccinea, manicata, and cinnabarina, Manettia bicolor, Eranthemum pulchellum, Gesnera zebrina, Æchmea fulgens, Dracæna terminalis, Euphorbia Jacquiniflora, Jasminum floribundum, Epiphyllum truncatum and its varieties, Luculia gratissima, Clerodendron splendens, macrophyllum, and latifolium; these, with a few others, well managed, will produce a splendid effect, standing prominently out in the dead of winter. Shading may be dispensed with now to advantage; let Allamandas, Stephanotis, Dipladenias, Clerodendrons, and all similar plants be well exposed to the action of the sun and air, in order that the wood on them may be thoroughly ripened, ready for a season of repose; to this end give them no more water than is absolutely necessary to keep them from drooping. J. G.

GREENHOUSE HARD-WOODED PLANTS.

Now that most of the plants are housed, air should be admitted abundantly. In arranging the plants take care to set the Boronias, and other more tender kinds, in the most sheltered part of the house. It is a good plan to place them on a part of the front shelf, and keep the side lights closed, unless the weather is very soft and mild. Although it is generally a rule that all plants should be shifted before this time, still any very free plant, that is likely to suffer for want of pot room before spring, might have a small shift; however, be particular in giving good drainage, and mix plenty of sand with the soil. Proceed with the training of the various climbers, and should any of them require new trellises, let it be done speedily, so that the foliage may draw out properly before the cold weather begins in earnest. Nothing looks worse than a plant with the backs of the leaves turned up to the eye, it tells tales to the practised observer all winter; whereas, a house filled with nicely trained, and well grown plants, is always a source of gratification and pleasure.

Azaleas.—Lose no time in arranging the plants in their winter quarters; those well set with bloom should have the most lightsome places, the others may stand in the more shaded parts of the house. Take out any of those growing in hothouses, so that they may have a little rest, which will enable them to start with fresh vigour in spring.

Camellias.—Follow last month's directions, only be very careful in the use of the syringe, applying it less every week. J. F.

Heathery.—If not already done, lose no time in getting those plants into their winter quarters, for though the weather is splendid now, we may expect a good soaking of rain when a change does come; and to get the pots saturated at this season would be almost certain death. Examine them closely, and see that the large plants are not suffering for the want of water, and that they are all clear from mildew, which is very prevalent this season. The general rule of perfect cleanliness must be attended to, and air must be freely admitted at all times, until frost renders it necessary to close the house. For the distribution of sulphur among plants, Fry's Sulphurater will be found an exceedingly useful instrument; indeed, no garden can be complete in its arrangements without it. W. P. A.

GREENHOUSE SOFT-WOODED PLANTS.

Pelargoniums—All plants cut down last month, and which have made shoots half an inch long, should now be shook clean out of the old soil, and repotted into smaller pots, according to the size of the plant and quantity of roots; using for the purpose a good rich compost, bearing in mind that the pots must be clean and well drained. Mix with the crocks or potsherds a small portion of charcoal, broken into small pieces; place the plants in a house or pit for a few days, until they are established in the pots, when air may be given gradually until they become strong, dwarf, and bushy. Keep them clear of all decaying and superfluous leaves. Stop those which were potted early, which will cause them to throw out side branches, and flower early. Pot off from the cutting pots such as are sufficiently rooted; these must be kept close for a few days, until they strike fresh root. Cuttings may yet be put in to keep in store-pots through the winter, for late summer and autumnal purposes in the ensuing season. Take cuttings of the scarlet varieties, and put them round the outside of pots, where they may remain for the winter, and be potted early in the spring for bedding and other purposes. Pot off into small pots such seedlings as are large enough, into a good rich compost, to encourage them to fresh growth. Seeds may yet be sown for late flowering next season. The season being now advanced, the plants generally should receive some shelter from the early frosts and heavy rains, as the damp and cold atmosphere at this season is liable to give them a brown spot on the foliage, which will take a long time, with good treatment, to eradicate. When housed a slight fumigating is necessary to cleanse them thoroughly before the winter sets in.

Calceolarias.—Shake clean out of the old soil, and divide the herbaceous kinds, re-pot into small pots in a rich, light, sandy compost. Keep them close for a few days until they are established, when you may give air freely. Pot off from the store pots such as are rooted. Put in cuttings of the shrubby kinds under handglasses or in pots in a cold frame, in equal parts loam, peat, and silver sand, with plenty of drainage. Pot off into separate pots such seedlings as are large enough, and sow seeds for late flowering next season; place them in a shaded situation until they are up, when they may be removed to the light. Water carefully, as they are very liable to damp off, and fumigate occasionally to prevent the green fly, which is a great pest among this class of plants.

Cinerarias.—If not previously done, shake out of the old soil, and divide those; re-pot into a good, rich compost, and keep close for a few days; when rooted give all the air possible. Look carefully for mildew, and dust with sulphur those leaves affected with it, or remove them as far as practicable for the health and appearance of the plants. They should now have protection in a cold house or pit, as they are very tender. Seedlings should now be potted into separate pots, and placed thinly in the front of a greenhouse or cold pit. See they do not get infested with green fly.

Chrysanthemums.—These should have a final shift.

Stake and tie out as thinly as possible to admit the air and give them strength. Give liquid manure to such as are established. Water liberally, and never allow the plants to flag from want of water, or they are very liable to lose their bottom leaves, and become unsightly.

Routine.—Continue to turn over heaps of manure and compost, that they may sweeten preparatory to housing for autumnal purposes. House, when dry, such as are ready, and wash pots every opportunity that they may be ready also. House Salvias, and other late flowering plants, before they get injured by the early frosts. H. R.

FLOWER-GARDEN.—OUT-DOOR DEPARTMENT.

The glory of our flower-gardens is now fast wasting away, and before many nights are past, we may expect the Ice King to make all desolate; while, however, they remain fresh, endeavour to keep the beds neat by the timely removal of decaying flowers and foliage, and sweep and roll the walks, and grass as often as is necessary. Any plants which it is intended to take up and preserve through the winter in pots, should be attended to immediately, or be protected by coverings at night for fear of frost. Such things as Pelargoniums and Calceolarias are materially assisted after they are potted, by being placed on a gentle bottom heat until they draw fresh roots. Proceed with the propagation of stock as fast as possible, recollecting, that every day lost after this time, is a chance of success thrown away. Now is the best time to put in cuttings of Calceolarias; and, if placed in a cold frame, they will root with great certainty, but in heat they will not root at this season. Chinese, Bourbon, and Hybrid Perpetual Roses, will also root freely under the same treatment, and, if properly treated, will make admirable plants for bedding out next season, or for blooming in pots next autumn. So soon as the beds are cleared, trench them up, manure, if necessary, and get in the bulbs for the spring display. The annuals sown last month must also be attended to, and, where large enough, they may be transplanted at once to the permanent beds, and the same with Heartsease, Alyssums, Phloxes, Primulas, Drabas, Iberis, Pinks, &c., &c., from the reserve garden. Next year, gardeners about town will require to have their gardens gay early, and in that they will not succeed unless they begin now. Where alterations are contemplated, proceed with them at once; first, however, convincing yourself that they will be improvements, and not mere alterations. We are of opinion, however, that to render the grouping system permanently interesting, occasional changes in the form of the garden are as necessary as in the plants with which the beds are stocked. Do not forget that smooth, polished turf is one of the principal charms of an English garden, and therefore, if your lawn is uneven, take the turf up, and and have the ground made perfectly level, and, if necessary, run a few deep drains across the lawn, before the turf is relaid. J. C.

Rose Garden.—Many Perpetual Roses will still be flowering if the weather is dry, so that they should in every way be kept perfectly clean and neat, that they may be enjoyed at every favourable opportunity.

Those that have been budded should be frequently looked over, and the bandages removed as soon as the bark begins to swell so as to show the marks of the binding, and any shoots that may be liable to rub the recently inserted buds by blowing about, must be tied so that they cannot come in contact with them. Continue to tie up all that have started into growth, or they will be very liable to be blown out. Where it is intended to make new plantations, the ground should be got ready, if possible, by the end of this month, so that they may be planted early in November. Directions were given as to the preparation of the ground in the first parts of this work, so that it would be useless to repeat them here; I shall, therefore, merely point out the advantages of early planting, viz., the ground will work much better before it gets saturated with rain than after; consequently, those that are planted very early in November, will get rooted before the winter sets in, and, of course, will flower very much better the following summer than those that are left later, for, when the soil has to be trampled upon after it is soaked with rain, Roses seldom do well in it without a great deal of labour being bestowed upon it to get it well pulverized. They have, also, the advantage of the earth being firmly settled about the roots by the autumn and winter rains.

Roses in pots, for forcing, must be gone over from the middle to the end of the month, and carefully turned out of the pots, if any soil has worked down among the draining it must be cleaned out as much as possible, so as to leave the drainage unimpeded; after which, replace the pot on the ball, and with some fresh soil, prepared as recommended in previous numbers, top dress them, after which they must be set in their winter quarters to be ready when wanted. Where the stock is short of established plants, any of the hybrid perpetuals that have large double flowers may be potted by the middle of the month, and treated as the others, except that they should have a little shading for an hour or two in the day if it is very hot and drying; these may be forced into flower by the end of April, and through the month of May. Many plants that are growing freely in pots, of China, Tea Scented, and similar Roses, will now be showing plenty of bloom buds; these, if set in a pit where they can have the full benefit of the sun, and be protected from frost, will continue to flower till nearly Christmas.

Any kind of Roses in pots that have been struck during the past summer, should be housed for the winter by the middle of the month, and plenty of air given them night and day, except it should be frosty. H. M'M.

Arboretum.—The planting of evergreens and deciduous trees connected with this department of gardening, should now be prosecuted in good earnest; every tree planted this month with common care will grow much more vigorously next spring than any later planted ones, however carefully treated. The removal of large trees which were prepared at this time last year for the purpose may be proceeded with. The mechanical appliances for this purpose are now so perfect, that not only is there a certainty of safe removal, but trees of such a size may be operated upon as to impart to a new place an appearance of many years' growth; and, what is better, the mistakes of former planters may be rectified by the removal of valuable specimens to more appropriate sites. Whatever work of this kind is in contemplation should be decided upon, as no large trees ought to be removed without one year's preparation, which consists in digging a trench round the stem at a distance from it apportioned to its size, say from two to four feet, the trench to be three feet deep, and one foot wide, and filled with light sandy compost. I have known such a compost to become in one season a complete mass of roots. Many persons leave the trench quite open; I would not recommend it. Under the improved methods of planting which characterize the present day, much of this kind of work may, for the future, be avoided; and here I would again suggest, that those to whom this important work is confided, should well consider the end thereof, and what they propose to effect after the lapse of many years. Present effect, of course, is not to be slighted, but let it be produced by plants which will cause no regret for their removal when they stand in the way; those intended to remain permanently, should be so disposed that in after years they may give a character to the place, and an evidence of design on the part of the planter. It is needless to dilate upon this, as it is an idea which has been gradually becoming impressed upon the minds of men of taste, and has arisen on the one hand from the greatly increased mass of materials which the planter possesses for producing effect in landscape or garden scenery, and on the other, from careful observation on the misapplication of the means possessed by former planters. It is not *mal-apropos* to this subject to record an observation, made to the writer a few days ago, by Lord Hardinge, who certainly did not go through India with his eyes shut, and whose taste for planting is at the present time being exercised with very great effect. Speaking of the Cedrus Deodara, his lordship observed, "It is all very well to get them to feather out close to the ground, they are certainly handsome, but I want to see them as I often have in India, shooting up their immense trunks to a great height, from whence the branches diverge horizontally, and droop in the most elegant manner." To attain this object, his lordship proposes to denude his trees of three or four of the lower branches annually. In some cases this might be a good plan, but I should rather, if it could be done. attain it by planting other shrubs so close as to kill the undergrowth gradually, taking care to give the Deodar plenty of head room.

Shrubbery.—The length of the preceding remarks, which appeared to me appropriate to the present season, preclude my continuing my list of desirable shrubs, which will be resumed next month. Operations now are all active, planting, re-arranging, alterations, and formation of new parts, being in full season. J. C. R.

Auriculas.—The time has now arrived when these will require a share of the florist's attention. Examine the pots to see if the drainage is quite complete, for if water remains to sour the mould in which they are growing, there is little chance of success. The frames and lights by which they are to be protected should be examined to see they are in no way deficient of their charge; the frame should be supported on bricks at each corner which will allow of free air, and the pots plunged in coal ashes, as a preventative of worms.

Carnations and Picotees.—Attend to the directions in last month's calendar, potting off layers, &c., &c., as they require it, and protecting them from excessive wet.

Dahlias.—The season of their beauty is now drawing to a close, previous to which see that the names are correct; that the desired seed is secured before being injured by frost, and that the promising seedlings are receiving a due share of attention. It is advisable in the event of a sudden change to have a little earth drawn round the stem, and crown of the roots, in a conical form, which has a two-fold purpose, that of preserving them from frost; and securing the crowns from too much moisture.

Hollyhocks.—Attend to the gathering of seed from the best kinds only, by which means alone is the chance of an improved race to be expected.

Pansies—intended to bloom well in spring should, without loss of time, be planted in a well prepared bed of well decomposed cow manure and leaf mould, and in a situation sheltered, without being dark and confined. If the natural soil is too stiff or adhesive, some proper should be substituted if practicable, or the plants be kept in pots till spring. In the meanwhile, the soil, by very frequent stirring, frosts, &c., &c., may become more suitable.

Pinks.—These should now be all planted as recommended last month, in the beds in which they are intended to bloom next summer, reserving a store in pots for deaths that are likely to occur during winter.

Tulips.—Offsets and weak bulbs of these should be got in during the month, which will be found very advantageous to their future development, as every day they are kept out of the ground after they have commenced a new growth tends materially to weaken their bloom. The main stock may be also got in, if the state of the ground will permit, preserving all the uniformity of colour, height, and sorts, as to give the beds, when they are in bloom, the greatest possible effect. Avoid using the dibble in planting them—a practice only calculated to compress the soil and prevent the bulb from making a bold start. The best method is to mark the bed into lines seven inches asunder, and again crossing them at the same distance, and plant in the crossing of the two lines. Use a little river sand round the bulbs, and replace the soil lightly to the depth of four inches; the beds must then be levelled, hooped, and matted; as the heavy rains are injurious before the bulbs are in a state of growth. T. B.

FRUIT-GARDEN. -IN-DOOR DEPARTMENT.

Fruiting Pines.—Pay attention to the autumn crop of fruit by watering when necessary, and syringe occasionally on fine afternoons. Slight fires by night are now necessary, and continued through the day when the thermometer indicates a temperature lower than 70 deg. The plants for next season's crop will now have made their growth, and consequently will now require a drier atmosphere, much air, and as much exposure to light as you can get for them. This will enable your plants during the season of rest to provide a sufficiency of food for the future fruit. The night temperature of these plants must not exceed 60 degrees.

Succession Pit.—Regulate, at this season, all young plants in pots; such as require a shift, let them have it. Refill your beds with fresh or partly fresh plunging material, and arrange your stock for the winter, keeping them near the glass, and place them a liberal distance apart. Keep up the required heat by fresh additions to the linings, or slight fires, if such be your mode of heating.

Vineries.- The principal care here is to keep all your houses containing ripe grapes as dry and airy as possible; look over each bunch once or twice a week, and remove decayed berries; and pinch off laterals, and useless or crowded leaves, to admit air to the bunches. Fire heat will be requisite, not so much during the night as on damp days; a little, however, may be continued through the night when wet, or very cold; as, to keep Grapes fresh till January, it is necessary the foliage should be kept green and healthy. This is materially assisted by a foot or two of dry leaves being placed on the border towards the end of the month, which, by keeping the border somewhat warm, prolongs the growing season, and keeps the Grapes fresh.

The early houses may be started the beginning or middle of the month, if Grapes are required early. Presuming the Vines have been dressed and tied, place on the sashes, and, if you have the opportunity, keep up the heat for the present by a ridge of hot stable-dung inside the house, which by turning over daily, and adding fresh material occasionally, will keep the house sufficiently moist, and cause the Vines to break strong and regularly. A lining of leaves and dung should likewise be placed on the outside border. The night temperature may be 45 to 50 degrees.

Vines in Pots will now be ripening their wood: allow them all the light and air you can, and gradually reduce the quantity of water. The great object should now be to to get firm and well ripened canes. Where the wood is ripe, the plants may be removed to a north wall, to rest them for a time before starting. J. S.

Figs.—Not a shoot more than will be required next season should now be allowed to remain on these trees, and in order that these be as well ripened as possible, this being the principal point to be regarded, our previous directions must be attended to.

Peaches.—Before the lights are put on the early houses, any pruning that is requisite should be done; but, if our former directions have been attended to, there will be but little wood to be removed at this season. Remove all the old ligatures of the past season, and thoroughly cleanse the trees of everything likely to harbour the eggs or larvæ of insects. If any old worn-out trees require to be replaced with younger and better ones, this is the most proper season to do it; and the best trees for the purpose are those that have been trained for from five to seven years. These are preferable for several reasons—they will come into bearing at once, and the *sort* will be known, which cannot be always the case with young trees, however carefully attended to in naming. By removing them carefully without injury to the roots, and by planting them, not too deep, in a border of good turfy loam, a light crop may, without harm to the trees, be taken off the first season. The wood on the trees in the late houses, ought to be ripe by this time; the leaves will, therefore, be falling, and as soon as they are off take advantage of fine weather to remove the lights off the house for a few days, and while off do what pruning may be required to them.

Strawberries.—These should now have but very little water given to them; the principal point to be aimed at, is to get the crowns as well formed and ripened as possible before the short dark days. Pinch off all runners as they appear, and attend to previous directions. M. S.

Cucumber House.—If the plants are still in a thriving condition they will require slight fires by night, which will be more favourable to the increase of green fly, which must be kept in check by fumigating with tobacco. Where the plants have been allowed to get past recovery, they had better at once be cleared out, and every part of the house be thoroughly cleansed. The walls should have two coats of hot limewash put on them; and see that the hot-water pipes, &c., are in a condition to insure a proper command of heat when most needed. If fresh turfy loam can be obtained this will be a good time to collect it, as it will be dry and sweet; and if packed in a heap it will be ready for use at any time through the winter, and will not require any turning or pulverizing previous to using, but may be chopped down with a spade, and used rough as required. If the foregoing has been already done, and the plants planted out, strict attention must now be paid to keep the atmosphere of the house constantly moist by frequent syringing, as the small thrip is sure to make its appearance, and will commit sad depredation on the young plants. Allow the plants to grow freely without stopping, until they reach the top of the house; this will induce a more robust growth, and the roots will become strong. By admitting abundance of air in the early part of the day, and not too high a temperature by night, the stems will become comparatively woody and firm, before the dull short days set in; for they need an unimpaired constitution to get through December and January in a fruitful condition.

Melons.—Where hot-water is not applied to their forcing, there will be some difficulty in getting them well ripened after this time, without they are in a very forward state; endeavour to keep the foliage as healthy as possible, and keep up a brisk heat by either hot-water or dung linings. If they require any water at the roots, let it be given warm, and in the early part of the day, so that they may get thoroughly dry before they are shut up in the afternoon. W. T.

FRUIT-GARDEN.—OUT-DOOR DEPARTMENT.

The planting of fruit-trees should now be proceeded with, if the necessary preparations have been made for them; if not, do not plant because the present time is recommended, as upon the proper preparation of the soil, more particularly as regards draining, the well-doing of the trees chiefly depends. In planting keep the collar of the stem at the surface of the soil as near as possible, spread the roots carefully, put fine soil over them, and neither lift them up and down, or tread heavily upon them. The rains of autumn will settle the soil about the roots much better than could be done by any other means. This is a good time for root-pruning luxuriant fruit-trees. I prefer lifting them altogether to digging a trench round them, as by so doing I can then better ascertain if there are any perpendicular roots.

Apples and Pears.—Take advantage of fine days to gather the fruit as it becomes ripe. By the end of the month most of it should be got in. Great care is required in gathering it, more particularly Pears, as they are very susceptible of rough usage, and soon show the slightest bruise. After the fruit has been laid in the fruit room a week or two, it should be very carefully looked over, for within more fruit decays the first few weeks of its being gathered than for many weeks afterwards, which, if not removed, will extend to the fruit which would have otherwise remained good.

Peach and Nectarine.—Every available means should be employed to accelerate the ripening of the young wood, as, upon this most important process being properly accomplished, chiefly depends the well-doing of the trees. All superfluous shoots must at once be removed, and as soon as the leaves will separate from the branches freely, they may be struck off with a new birch broom. Those trees trained against a flued wall will be greatly benefitted by a little fire heat. I am an advocate for early pruning, and I believe much good would result by adopting this course with fruit trees generally.

Fig.—The only winter pruning required is thinning the main branches and taking out long naked ones, which should be done immediately. I believe much mischief is done to this tree by the means frequently used to protect them during the winter. I am of opinion that in the Midland and Southern counties of England, the Fig will flourish and bear fruit without protection. The mode of pruning generally adopted I believe to be altogether wrong: instead of cutting out a portion of the young shoots, and nailing the rest of them close to the wall, they should be allowed to extend from eighteen inches to two feet from it. By adopting this plan I have invariably secured a good crop of fruit.

Plum.—If the weather should prove cold and wet, the remaining fruit of late sorts, such as the Ickworth, Imperatrice, Coe's Late Red, and Golden Drop, should be gathered, with their stalks attached, and suspended by them in the fruit-room; or they may be wrapt in thin paper, and will, thus treated, keep good several weeks. When the Imperatrice is shrivelled, it is exceedingly rich and sugary.

Grape.—Immediately the fruit is cut, prune the Vines. Let the leaves remain on the young wood left for bearing next year, as long as they will do so. Early pruning is of much greater importance in the cultivation of out-door Grapes than is usually attached to it.

Quinces, *Medlars*, *Walnuts*, *Chestnuts*, and other Nuts, should be gathered this month. The fruit of the *Service* tree, which is sometimes in request, will also now be ready to gather.

Raspberry.—Cut out the old canes that have produced fruit, and thin the young canes to about three or four to each stool, then manure and dig between them. It may be as well to leave the young shoots their full length until the spring, as in some situations during a severe winter they die back. Now plantations may now be made: plant single canes about eighteen inches apart, and secure them to *espalier* rails, which is an improvement upon the old plan of growing them in stools. The autumn-bearing should now furnish a good supply of fruit, if the weather be mild.

Strawberry.—Remove all runners from the plants, and manure and dig about those in rows. Some gardeners do not approve of this digging between them; asserting, that by so doing many of the roots are destroyed, which is undoubtedly true, but the benefits derived by the plants from the loosening of the soil, and the manure, will be far greater than the few roots which may have been destroyed by the operation would have been. The making new plantations had better stand over till the spring, but runners may still be bedded out for this purpose.

Berberries.—The fruit of this shrub is not only very ornamental, but also very useful as a preserve, it is also very useful for garnishing. For this latter purpose it should be gathered in bunches, and preserved in jars, in a strong brine of salt and water. H. C. O.

KITCHEN GARDEN.

Towards the end of the month the Asparagus beds may be cleared of their haulm, and a portion of the soil be forked into the alleys; then mix a little salt with some good manure, and lay a good coat over the plants, covering the whole with the soil deposited in the alleys for that purpose.

Celery should be earthed up as often as it becomes necessary, not only for the sake of blanching, but to preserve the plants from any injury that might arise from the effects of frosts. Cauliflowers sown in August will now require to be pricked out into frames, or under hand-glasses, at a distance not less than four or five inches apart; and care should be taken that they are at all times provided with an abundance of air, excepting, of course, when frosts are too severe to admit of its being done without injury to the plants. Some Lettuces, for a spring supply, should be treated in the same manner for a reserve crop, though the hardier kinds will often escape without injury in the open ground, still it is necessary to be prepared for any extremes. Where convenient, a batch planted now under glass would yield a supply in far greater perfection than there could be expected out of doors. Continue to transplant Cabbage, and fork the soil between winter Spinach. Tie up a portion of Endive and Lettuce weekly for a succession. Sow Mustard and Cress weekly, in boxes, for a supply of small salading, &c., &c.

As ground becomes vacant, manure, trench, and ridge it in steep-ridges immediately, and any alterations to be made must be proceeded with at once. Do not forget that thorough-drainage is the basis of good cultivation, and that, on heavy soils, labour cannot be better expended than in digging deep drains. When the subsoil is clay, burning may be resorted to with excellent effect. J. C. S.

WILD FLOWERS FOR OCTOBER.

Unless the votary of Flora be a student of Cryptogamic plants, country walks will now afford but little interest in a botanical point of view. Flowers are withered or withering, seed vessels are casting their ripened burden and the leaves soon follow the general law of decay. A few of the later plants will, of course, be found, and many even in good condition; such as some of the Hawkweeds (*Hieracia*), *Atriplices*, *Chenopodia*, and a few of the Umbelliferæ; but a great deal depends on the climate of the locality; thus, while the botanical ramble now yields comparatively little in the northern or eastern part of England, in the west, and especially the south-west, where the winter does not visit vegetation with such severity, many plants survive late into the autumn, and the common weeds are even seen in flower through the winter.

The search for Fungi among the heaps of dead leaves and other collections of decaying vegetable matter, will be well rewarded, if the weather be not too severe during this month. Many of the Mosses, too, fruit at this time, and the microscopic examination of these beautiful little objects, will reveal a world of curious and interesting structures, and furnish a very attractive indoors occupation to the botanist during the winter season. A. H.

ANIMAL KINGDOM.

Ornithology.—Summer, with all its pleasures, all its bright and sunny days, is past; the few last Swallows will soon be winging their way to some more genial clime, for they, like fickle lovers, are constant only while their path is strewn with flowers. Now is the time that old familiar notes come gratefully to the ear, they are like the greetings of old friends, who, although eclipsed for some short time by more showy rivals cannot be forgotten; for are we not more apt to remember longer those that have gathered round us when misfortune weighed us down, or when death has been hovering near, than those that have been merely companions in our sunny hours, disappearing when a cloud overshadowed us? We must admire the Nightingale's unrivalled notes, but I question with all his great gifts of melody, if they are so dearly prized as the sweet song of the Robin Redbreast, that little household bird, who, with all his failings, is still a general favourite both with old and young. Now the chirping of the pert old sparrow is not so much despised as when surrounded by more sweet voiced rivals; for as winter draws upon us, we cannot fail to feel a greater regard for those little birds who are our constant companions during the cold and dreary days of winter, than for those that merely sport around us when the summer sun is brightest. The woods now look rich in their autumn dress, and doubly so when seen under the influence of a bright October sun; the Bullfinch (*Pyrrhula vulgaris*) pipes among the nut brown foliage; the little Wren (*Troglodytes Europeus*) is busy with the fallen leaves, creeping about them like a mouse, prying into every nook, for she is a complete Paul Pry in miniature. Then there are those active little rogues the Tits, they make the woods ring with their merry notes; no sight can be more beautiful than to see a troop of these interesting birds busy amongst the scanty foliage; assuming every variety of attitude with the greatest ease, and constantly repeating their call notes, no doubt, as a guide to keep them together; those small companies consist generally of the following species, the Great Tit, (*Parus major*) Blue Tit (*Parus cæruleus*), Long-tailed Tit (*Parus caudatus*), Cole Tit (*Parusater*), and at times the Marsh Tit (*Parus palustris*), they are also mostly accompanied by a pair of the common Gold-crest (*Regulus auricapillus*), which are easily detected by their mouse-like notes, and also by a solitary Creeper (*Certhia familiaris*). In this manner they travel over a large extent of country, assembling at sunrise, dispersing when the shades of evening begin to close around, to seek some warm spot in which to doze away the chilly hours of night. Their life must certainly be a happy one, free, to all appearances, from care.

About the middle of the month, the Chaffinches (*Fringilla cœlebs*) commence their flight or partial migration, for I think, as winter approaches, a considerable number leave the country, particularly those that have been bred in the southern parts, their places being taken by others that have been reared farther north. In some years these flights are very numerous; they commence at daybreak and continue through the forenoon, after which few are seen; they last from a fortnight to three weeks, the number in each flock varying from six or seven to forty or fifty, their flight is westerly.

The arrivals this month are the Field-fare (*Merula pilaris*), the Redwing (*Merula iliaca*), the Woodcock (*Scolopax rusticola*), and the Mountain Finch (*Fringilla montifringilla*); in the moist lands the Twite (*Linaria montana*), will be found either in flocks by themselves. or mixed with those of the Linnet (*Linaria cannabina*). Having left their summer haunts in the north at the approach of colder weather, all the smaller birds that are gregarious, are now collected in flocks, and may be seen scattered over the stubble and fallow lands, where they remain as long as food is plentiful, or until driven by foul weather to the shelter of farm and rickyards.

H. W.

Entomology.—Although the declining year affords but little active employment to the entomologist, there are still on fine days many species of insects, even including Lepidoptera to be found enjoying the warmth of the sun's rays, and sipping the honey of autumnal flowers. The splendid Red Admiral Butterfly (*Vanessa Atalanta*) is conspicuous among these, its jet black wings ornamented with a broad red bar, together with its bold flight, giving to it quite an exotic appearance. They and several other butterflies, including the common Tortoiseshell (*V. urticœ*), on the approach of cold weather, contrive to find a safe retreat in some quiet corner of outhouses, &c., where they pass the winter. It is, however, chiefly females of the latest broods, which have not yet deposited their eggs, which thus pass through the winter season, in order to insure a fresh brood in the following spring, when they re-appear as soon as the sun's returning rays impart renewed vigour to animal life. The phenomena of hybernation among insects are amongst the most curious points in their economy, and will be treated upon in one of our subsequent notices.

In the early part of the month, the full-grown Caterpillars of some of the more common of our species of Hawk Moths may be met with on Privet (*Sphinx ligustri*), lime (*Smerinthus til*[illegible] poplars (*Smerenthus populi*), &c. The chrysalides [illegible] Death's-head Moth (*Acherontia atropos*) may also now be looked for when potatoes are dug up, and persons thus engaged should carry with them a moderate-sized bag, half filled with earth, with a layer of damp moss upon the surface, in which the chrysalides should be deposited as they are found. The greatest care should, however, be taken in collecting them, to disturb them as little as possible. Some persons prefer placing their chrysalides in bran or saw-dust. The perfect Death's-head Moth appears in October and November, and is remarkable, not only as being the largest of our native insects, but also on account of the peculiar markings on the upper surface of the thorax, which have all the appearance of a skull (whence the English name of the species). This insect is still further interesting, from its possessing the power of making a very distinct kind of squeaking sound, the precise nature of which, as well as the organs by which it is produced, being still undecided. The sound has even been heard before the insect has left the chrysalis shell; but it is, we believe, only just previous to that event taking place that the sound has been observed, at a time, therefore, when the enclosed insect was fully developed in all its parts, except the wings.

The Caterpillars of some other species of Moths may still be found, including the very destructive grubs of the *Noctua* (*Agrotis*) *segetum*, which occasionally commits very extensive injury in turnip-fields, devouring the roots, which it riddles in every direction, and so causes to decay with rapidity. When full grown it descends still deeper into the earth to undergo its chrysalis state; the mere pulling up of the infected plants, therefore, without any care being taken to collect and destroy the Caterpillars, will be but of little avail in averting the next year's injury. "Woods will still be found to produce many species of Moths (particularly Tortrices and Tineæ), by beating the underwood and hedges. Some species of Gnats (*Culicidæ*) and Crane-flies (*Tipuidæ*), peculiar to the season, may be found about ponds, and windows in houses. The hollow stems of currant-bushes, burdock, common dock, and various other pithy plants, should be examined, as well at this as at other seasons, for chrysalides, as many Caterpillars are internal feeders. Beetles will also often be found secreted in the hollow stems of decayed plants. The grubs found in apples, pears, and nuts, may be reared with care. They should be put into a cage, having damp earth at the bottom." —*Ingpen*.

The presence of an insect within the solid shell of a nut is as perplexing [illegible] circumstance to the minds of some persons, as the introduction of an apple within a dumpling is said to have been to King George the Third. The explanation of the mystery is, however, as simple in the one case as the other. The grub of the nut is the larva of a small long-snouted Beetle or Weevil (*Balaninus nucum*), and the parent insect makes its appearance in the perfect state, just at the time when the nut is newly formed, with the shell quite tender. It has then the instinct to make a very minute hole with its jaws in the shell, which hole is subsequently designed to receive an egg. From this egg, in a short time is hatched a little footless grub, which, when arrived at maturity, so often p[illegible] an unwelcome morsel in the mouths of those who delight in this kind of fruit. But here we still find the most wonderful adaptation of means to the end, for the little grub is not developed until the nut is well formed (the hole soon healing): did it appear earlier, it would be doomed to a premature death, as its voracity (like that of all young animals) is so great that it would in a very short time consume the small embryo nut. Its birth is, therefore, delayed; and hence it is that we occasionally put an apparently sound nut into our mouths, which, on biting it, is found to contain a grub not yet more than half-grown.

As our readers will perceive that we have not only endeavoured to render these Entomological notices a calendar of the times of appearance of different insects, but have also striven to render them practically useful, by furnishing hints concerning the habits, &c., of the species more especially hurtful or beneficial to the horticulturist and farmer, we shall close the present month's observations by warning the practical observer to destroy every specimen of the common Wasp, which he may now find in the windows of outhouses or dwellings; those specimens being females, which are in search of a quiet nook where they may pass the winter; each of them, if not destroyed, being destined to become the foundress of fresh nests. Although too late in the season to be of as much service now as at an earlier period. We may also mention that one of the best traps for Wasps may be formed of a couple of hand-lights, by placing one on the top of the other, making a small hole at the apex of the lower one, through which the Wasps are attracted by placing half-eaten fruit beneath the under one.

J. O. W.

BEGONIA INGRAMII.

Nat. Order, BEGONIACEÆ.

GENERIC CHARACTER.—Begonia, *Linnæus*. *Flowers* monœcious. Male :—*Perigone* four-leaved, segments subrotund, the two outer larger. *Stamens* numerous; filaments very short, free or connate at the base. *Anthers* extrorse, bilocular, loculi linear, separate, adnate to the margin of the obtuse continuous connective, twisting longitudinally. Female :—*Perigone* with a three-winged tube, connate with the ovary; limb superior, four-nine-parted, the persistent lobes imbricated in many series. *Ovary* inferior, three-celled. *Ovules* numerous, on a double placenta proceeding from the central angle of the cells, anatropous. *Styles* three, bifid. *Stigmas* thick, flexuose or capitate. *Capsule* with three membranous wings, three-celled, loculicidally three-valved. *Seeds* numerous, striated. *Embryo* orthotropous, in the axis of fleshy albumen. (*Endl. Gen. Plant.* 5158).

BEGONIA (Diploclinium*) INGRAMII.—Ingram's hybrid Elephant's-Ear.—Caulescent; leaves stalked, obliquely ovate-acuminate, sub-cordate at the base, glossy, slightly hairy on the margin; stipules tapering from a broad base, membranous, deciduous; flowers in dichotomous drooping panicles, which are "alternately" wholly of either sex [?]; outer sepals of the male flowers roundish ovate, inner shorter and narrower, the numerous erect stamens forming an open-tufted mass; female flowers of five spreading, nearly equal oblong, or obtusely-lanceolate sepals, with reflexed margins; styles terminating in a pair of spirally waved stigmatic arms; tube of the perigone furnished at the angles with broad unequal obliquely-angular wings.

DESCRIPTION.—Stems erect, woody, with scattered, elongate wart-like excrescences. Leaves, large, four inches in length, ovate-acuminate, very oblique, and semi-cordate at the base, smooth and dark glossy green on the upper surface, with sunken ribs, and slightly undulated margins, slightly crenate-serrate, having short scattered hairs from the tips of the serratures; the under surface also glossy, paler, the ribs sometimes tinted red; footstalks nearly an inch long, with membranous deciduous tapering stipules, attached by their broad base. Flowers in large drooping dichotomous panicles, on longish stout spreading peduncles; the pedicels furnished with opposite, ovate-lanceolate, deciduous membranous coloured bracts; the male and female blossoms borne alternately in distinct panicles, delicate light rose coloured. *Male:* outer pair of sepals roundish ovate, half an inch long, fleshy, rose-coloured, the inner pair alternating, shorter, narrower, and of thinner texture, oblong-lanceolate, or almost obovate, pale flesh colour, somewhat channelled down the centre, or boat-shaped. Stamens numerous erect, forming an open tufted mass, their bases united into a column; anthers oblong, yellow. *Female:* sepals five, more or less spreading, nearly equal, oblong, or obtusely lanceolate, in our specimens all having the margins reflexed, thus acquiring a nearly cylindrical form, three-quarters of an inch long, rose-coloured. Styles separating each into a pair of erect spirally waved, yellow, stigmatic arms, with a downy-papillose surface. Ovary oblong-ovate, triangular, the angles extended into broad, rose-coloured, unequal, obtusely angular wings; below the ovary, on the top of the flattened pedicels, is a pair of lanceolate boat-shaped deciduous coloured bracts. Ovary three-celled: ovules attached to a double placenta.

HISTORY, &c.—Begonia Ingramii is a garden hybrid; and is one of a large number of hybridized seedlings, which has been raised in the gardens of Her Majesty at Frogmore, near Windsor. It is one of the handsomest of the Begonias, as regards the size, delicacy, and dis-

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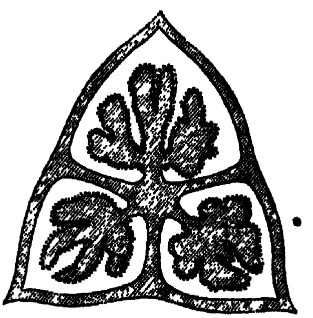
* We have hesitated to use, otherwise than as a sectional division, the genus Diploclinium proposed by Dr. Lindley, to which, if it should come to be hereafter adopted, B. Ingramii certainly belongs. The division of the placenta, in each cell of the ovary, into two plates or lamellæ, in certain of the species of the large and heterogeneous family of Begonia, seems to afford good ground for the separation of such as really possess this peculiarity, from those in which these plates are consolidated into one; but the question, as yet unsettled, is, whether the evident separation of the two lamellæ in some kinds is not united with the more simple form observed in others, by transitional stages, in unexamined species. There is some trace of this doubt in the fact that, in B. argyrostigma, in which the placenta is "double," the ovules are not attached, as is more usual, on both surfaces of each lamella, but only on the outer face of each. The Begonia cinnabarina of Sir W. Hooker has quite a different placentation, which does not accord with either of the divisions already proposed; in this species the placenta, as examined in a full grown capsule, is irregularly spread out into numerous lobes, the whole surface of which bears seeds. It may, therefore, form the type of another section or genus, to which the name Platyclinium might be applied, from the extended surface over which the ovules are distributed. The old genus Begonia would thus comprise at least the following groups—sectional or generic, as the value of the characters may be estimated :—

Begonia vera.—Placenta forming a single flattened plate in each cell of ovary. Ex: B. dipetala, albo-coccinea, Dregii, homonyma.

Diploclinium.—Placenta forming a pair of parallel flattened plates in each cell of ovary. Ex: D. fuchsioides, semperflorens, incarnata, Ingramii.

Platyclinium.—Placenta in each cell of ovary, deeply and irregularly lobed. Ex: P. cinnabarina.—M.



Ovary of B. cinnabarina; magn.

position of its flowers; and if, as it appears to promise, the habit of growth should prove equally good, it must become highly prized as a decorative plant. We saw it blooming in the Royal Gardens, during the month of August last, and were much struck by its distinct character, as well as its beauty. Respecting its origin, we learn from Mr. T. Ingram, jun., that he raised it from B. fuchsioides crossed with B. nitida; and that he has effected a real cross—a very remarkable one too, we think—is apparent from the evident traces of both parents, to be detected in the progeny. Several other hybrids of nearly equal merit have resulted from the same cross, but the one we have figured is selected as the best of those which have yet bloomed. The seed was sown towards the close of last year; and when we saw them last August, many of the plants were already in vigorous bloom.

Culture.—The Begonias are stove plants, and perhaps the easiest of all stove plants to cultivate with ordinary success. The shrubby kinds, such as the subject of our plate, are readily propagated by cuttings, planted in sandy soil, and set in any moist shady part of the hothouse, or more speedily by being placed in a close shaded hot-bed. The cuttings, when rooted, may be potted singly into small pots, and should be shifted on into larger ones as their roots become crowded; and, within moderate limits, this may be carried to any extent, according to the size of plant that may be required. The soil should be light and free, and moderately rich; such, for example, as a mixture of half mellow loam, a quarter leaf mould, and a quarter dried lumpy cow-dung, the compost being freely intermixed with sharp gritty sand. Watering must not be overdone, especially when they are inactive. In winter any part of the stove not too hot and close will suit them: in summer, they for the most part prefer moderate shade, and the calm damp atmosphere of a pit. The culture of Begonias, as decorative objects, is, however, a subject on which we propose to have more to say hereafter.—M.

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THE CULTIVATION OF THE MUSHROOM.

THE Mushroom is a vegetable luxury that comparatively few people enjoy. The means, nevertheless, for its most successful cultivation abound in almost every establishment, yet how rarely is it met with, even in gardens that boast excellence in vegetable culture, save as in a state of spontaneous growth, at the foot of an old lining or dung-heap. Amongst the many difficulties that the gardener has to encounter in the production of first-rate vegetables, none presents fewer than the Mushroom. In an artificial state of culture it neither requires the genial influence of a ray of solar heat, nor the refreshing circulation of a salubrious atmosphere, so beneficial to all other vegetables. Enclosed in any subterranean cellar or shed, uninfluenced by external temperature, it will thrive most luxuriantly, providing proper preparation be made for the spawn, and an uniform temperature of from 55 to 60 degrees be maintained. Few insects attack it, and those that do are readily extirpated. A correspondent writes:—"I have gone to considerable expense in erecting a Mushroom house, but have never succeeded in procuring Mushrooms." Here is a frank acknowledgment of the means at hand, but a knowledge of the art of properly applying them being wanting. The truth is, the Mushroom is a vegetable requiring a system of treatment peculiar to itself, and so widely different to that of any other, that those who do not make themselves acquainted with its nature and mode of growth, necessarily fail. Now, every gardener knows that Mushrooms will only grow in certain situations, and at certain seasons of the year, and that they are scarce in some seasons and plentiful in others. With a little observation and judgment, may be gathered from these two or three facts sufficient data on which may be founded a system of practice at once simple, and certain of success. First, Mushrooms are never found except where, at some time or other, the excrement of cattle has been scattered, generally that of horses; hence, we infer that horse-dung is the most suitable nidus for the reception and nourishment of the spawn. Secondly, they almost invariably appear when the heat of the summer is declining, showing that a temperature somewhat higher is necessary for the growth of the seed than is congenial to the production of the plant. Thirdly, persons accustomed to observe their growth in a state of nature, can generally anticipate a plentiful or a scarce supply; and if we extend our observations a little further on this head, we find that in cases of the spontaneous production of spawn in linings or dung-heaps, that it runs, as it is termed, most freely where the dung is neither very wet nor extremely dry.

The first and most essential requisite in the cultivation of the Mushroom, is good spawn. It is just as inconsistent to expect a good supply of Mushrooms from inferior spawn, as to anticipate a good crop of any other vegetable from seeds of a bad quality.

Spawn of excellent quality may be made in the following manner. To one barrow-load of moderately strong loam add two of horse-droppings, fresh from the stable, and two of cow-dung (sheep or deer-dung may be used with equal success). Thoroughly intermix these in a dry state, then wet and work the mixture to the consistence of mortar, and spread it on a level floor. When it is set sufficiently firm, cut it into bricks about a foot square, place them on edge in an airy situation, but sheltered from wet, and as soon as they become tolerably dry, build them into a square heap, placing a piece of spawn on each brick, betwixt every layer, and cover the whole with dry litter. The heap will now require attention every day, for fear it should ferment too strongly. If the Thermometer rises above 90 degrees, the litter must be removed, the heap flattened, and recovered. Should fermentation not take place sufficiently for the working of spawn, it will be necessary to add more litter: in a word, too much attention cannot be made at this crisis of spawn-making. If the spawn does not run freely through the whole mass until it becomes of a whitish appearance, it will be of inferior quality; but if it passes this state, and upon breaking the bricks, long filaments or threads are found, it will be almost useless for the purposes of reproduction. This process may be gone through with success any time from March till September, but the spring may be considered the best time, as it is easier to raise the temperature than to depress it; and a better opportunity of drying the spawn is gained, which is a matter of vital consequence in keeping it for any length of time. Spawn well made, properly dried, and securely stored, will retain its properties for almost any length of time.

Horse-dung, as has before been observed, is one of the chief, if not the most ready, of all manures in the generation of natural spawn; and hence it is most generally used in the cultivation of the Mushroom; and when properly managed, I would venture an opinion that no manure equals it for this purpose. But as we generally see it used, or, rather abused, a successful result is not so general as could be desired. The following is a summary of the system of Mushroom bed-making, than which nothing can be more incongruous with the anticipated result. The dung is either fermented until it nearly reaches that state which we call spit-dung, or it is procured in such condition from exhausted linings, and thrown together in the shape of a bed, three or four feet thick, made firm by treading or beating, left for a fortnight or so, then spawned again, left for about the same space of time, when it is earthed over to the thickness of half an inch, and covered with litter. If the dung is in that state of dryness and heat which is suitable for the working of the spawn, in due time Mushrooms appear in abundance on the surface of the soil, but few come to perfection. By this time the bed is found rather dry, a drenching of cold water is given, and a system of treatment concluded as inconsistent with the production of the Mushroom as an enlightened gardener could be found practising.

A few years ago, Mr. James Barnes, in an article in the *Gardener's Magazine*, endeavoured to show the absurdity of the above plan, and at the same time indicated a method of his own, which he had practised successfully for many years. It is simply as follows:—At any season of the year procure fresh horse-dung, divest it of the longest of the litter, but I find this may be used while dung is scarce; add sufficient soil-loam, if it can be obtained, but other soil will answer, to prevent excessive fermentation. When sufficient is procured, make the bed, if possible under shelter, and of a substance suitable to the season of the year—say a foot and a-half in summer, and from three to four feet in winter. Tread and beat firmly as in other cases, and let it rest until a settled temperature of from 80 to 90 degrees is obtained. At that time introduce pieces of spawn about two or three inches square, a foot apart, all over the surface of the bed. It is better that the spawn be in large pieces, as if the temperature of the bed should accidentally rise, so as to burn it, there is a chance of the middle of a large piece being uninjured, while a small piece would be destroyed altogether. Let the bed remain a fortnight, or three weeks, then examine the spawn, and if it be running freely, earth it over to the thickness of three inches with good rich holding loam, and beat it it firmly and smoothly down with the back of a spade, and cover with litter to the thickness that the temperature of the bed will indicate as necessary. In about a month, give the whole bed a soaking of hot water, boiling, or nearly so; and water the litter with the same. This will infuse a genial warmth and moisture into the bed, peculiarly conducive to the growth of the Mushroom, and destroying every living insect. I may mention, in justice to Mr. Barnes, that I have seen this system practised with astonishing success. I have a bed at the present time made upon this principle, literally a mass of spontaneous spawn. The slight fermentation obtained by the addition of the soil encourages the production of natural spawn, and is highly conducive to the growth of that procured artificially. The gradual decomposition maintains the dung in a state of fermentation a great length of time, and the quality or virtue of the manure is secured for the nourishment of the crop.—S.

ON TRANSPLANTING MODERATE SIZED EVERGREEN SHRUBS AND TREES.

By Mr. JAMES M'NAB, Curator of the Royal Botanic Garden, Edinburgh.

FOR the information of those whose intention it is to carry on transplanting operations during the present winter and spring, not being provided with the regular transplanting machinery, I beg to offer the following observations :—

The tree or shrub is first prepared by opening a trench all round, and at a sufficient distance from the stem to prevent cutting the roots with the spade. After getting down about two feet, take a small four or five toothed tan fork, and remove the earth gently from the ball, in order to save as many of the fibres as possible. While removing the soil, great care is requisite to keep the ball of earth as perpendicular as possible, even below what is intended to be the under surface, and on no account undermine until the ball is sufficiently bound up. Carry on the reducing of the ball in a perpendicular manner till within a foot and a-half or two feet of the stem; this, however, must [illegible] judged according to the size of the plant, the matted nature of the ball of earth with the roots, or to the strength which can be commanded at the time of lifting. Where human exertion is to be the raising power, it is better to curtail the ball of earth, so as the strength at command will be sufficient to raise the mass without difficulty, or stressing the individuals, which is not unfrequently the case when too much is attempted, besides, the plant is apt to sustain injury by the loosening of the soil from the roots, whereas, if a smaller ball of earth were attempted, the risk of injuring to the plant is much less. Supposing the ball of earth reduced to the size required, the strong roots, if any, should be cut close to the surface of the ball, and the smaller or more flexible roots tied to the remaining mass. Round the ball of earth and roots, place some soft straw or hay, and surround the whole with a mat, previously doubled long ways, keeping the doubled portion lowermost, but not below the level of that part of the ball intended to be the bottom; this, however, must be judged according to the depth the roots are found. Sometimes the ball will be found to bear a much greater proportion of depth than breadth, but more frequently the reverse. After adjusting the mat properly, tie round it loosely, within six inches of the top, and six inches of the bottom, a piece of untarred yarn or packthread, and then place between the yarn and mat, a sufficient number of pieces of thin boarding, each varying from two to three inches broad, of equal lengths, and from three to four inches apart all round the ball, keeping the yarn of sufficient tightness to adjust them properly, and at the same time to prevent their falling down. The most convenient wood for the purpose is barrel staves, keeping the concave side next the ball. After the spars or staves have been properly arranged, a strong half-inch tarred rope doubled, must be put round the upper part of the ball, making it fast in front but not too tight, take the remaining portion of the doubled rope down the front as in Fig. 1, and surround the ball with it again near the bottom, afterwards twist the ends of the rope several times round the lower double each way, so as to fix it without having recourse to knotting, which must always be avoided. After the ropes have been adjusted of moderate tightness, place under the rope at each side of the ball, a small piece of packthread or tarred yarn, about twelve or fourteen inches long, one on the upper, and the other on the under rope. Wrack sticks must be used both on the top and bottom ropes, and on each side, then wrack both up gently, and at the same time twisting up the ropes to a sufficient tightness, then tie the ends of the wrack-pin down with the piece of short rope yarn previously put in.

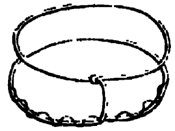

Fig. 1.

The method just described is quite sufficient for ordinary sized balls, but if the mass is large, it is necessary to use larger ropes, and two wracks upon each rope.

Supposing now that the ball is firmly bound together, begin to undermine on one side; but, before doing so, it is necessary at this stage of the operation to consider which way the plant (tree or shrub) can be easiest taken out from the shrubbery in which we shall suppose it to be growing; if egress is easiest afforded on the south side, the undermining must take place on the east and west sides. While undermining the one side, it is necessary to put a prop between the ball and the bank on the opposite side, so as to prevent the possibility of the ball slipping down, until the undermining is completed. If the ball is solid, much of the earth below not containing roots can be removed with propriety; but if loose, it is requisite to put a little straw or soft mat pad, and then insert a strong board varying from 6 to 8 inches in breadth, and of such a length as to project beyond the ball at each end about 2 inches. When the one side is finished, remove the prop and allow the ball to lean gently down on the lifting board just put in, remove now the loose soil from the opposite side, and place below a little straw or soft mat pad, and a corresponding lifting board to that used on the opposite side. This operation completed, the plant will rest wholly on the lifting boards. The next process is to remove the loose soil from under the ends of the boards on one side. Two strong tarred ropes, each 10 or 12 feet long, being in readiness, one is worked under the ends of the boards at one side, and the other under the opposite ends. Another way is to put them in at the time the bottom boards are being placed. The ropes should be worked under the boards about one-fourth from each end, dividing the rope as near as possible. Fig. II. *a* represents the lifting boards with the ropes under; *b* represents the boards and ropes with handspikes attached. If the plant is not of large size, the tying of the ends of the ropes together will be sufficient, but it not unfrequently happens that the ropes get together on the handspikes, unless some contrivance is used to prevent it. Notches cut out of the boards as shown in Fig. II. *c*,—or pieces attached to the bottom of the boards to keep the ropes from moving, as on Fig. II. *d d*,—are useful enough. It often happens that the lifting boards must be sacrificed, as shall afterwards be explained, it is therefore needless to go to expense with them. To prevent the ropes getting together, it is necessary to fix a loop at the extremity of each rope, taking care that they shall be all the same height above the level of the ball, and so made as not to slip, and at the same time to be easily unfastened. Into the eyes formed on the ropes place strong handspikes parallel with the bottom boards, 7 or 8 feet long, according to the mass to be lifted.

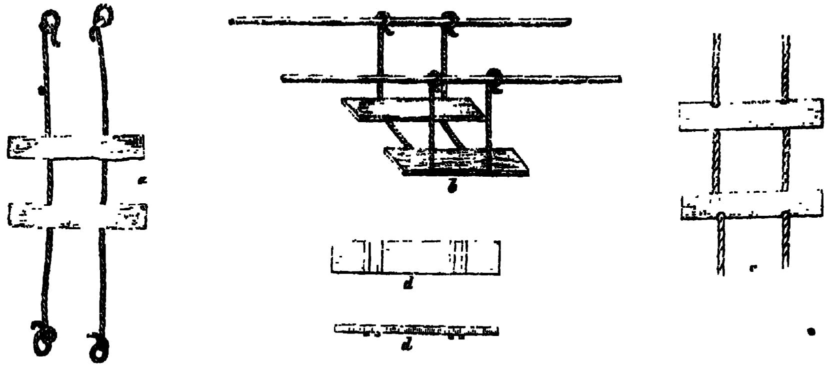

FIG. II.

After the above arrangements are completed, sufficient strength must be got to raise it. As the most difficult part of the operation is the removing the mass from the hole in which it has been growing, and not being provided with a regular transplanting machine. In ordinary cases, the plant, if prepared as before described, may be easily lifted and conveyed away; but if too large to be raised at once, the task becomes more difficult. Various methods may be suggested for getting the plant out—one, by cutting a sloping bank from the surface of the ground to the bottom of the hole, and working the plant gradually up the slope. With heavy plants, this method is preferable to lifting it at once, which is apt to stress the men employed; besides, the difficulty of getting the handspikes low enough so as to have sufficient purchase when the lower part of the ball becomes near the surface of the hole. The following is the method which I generally adopt when the mass is large, and which prevents the possibility of any of the hands sustaining injury:—While the plant is still resting on the bottom of the hole, with the necessary ropes and handspikes appended, at one side, place a few men to keep the handspikes tight, so as to prevent the ropes from slipping through with the extra strength placed on the opposite side for the purpose of lifting that side; when raised, fill up the side lifted with earth about six or eight inches, and firm it well down, putting it as far below the plant as it can well be got. This being done, place the smaller strength on the side lifted, and the greater on the opposite so as to raise it up also, and fill in below as before; carry on in this manner, gaining about six inches each time, until the plant is brought to the surface of the ground. This done, spread out a large bass mat, strong and quite entire,* having all the ends tied as short as possible, place the plant on the centre of it, and tie the ends up to the handspikes on to the ball as tight as possible, so as to prevent the possibility of the loose earth from the bottom dropping out either while carrying it to its destination, or placing it on a machine for the same purpose. As the mat has to be drawn from below before planting, great inconvenience is occasioned if it is in holes, or has loose ends hanging down, catching on the ends of the lifting boards and spars. Trifling as this observation may appear, it is of the utmost consequence while carrying on the work. Supposing the plant fairly out of the hole, and mat fixed under it. If the distance is short to the intended place of reception, it could easily be carried. (Fig. III. represents a plant prepared for being carried, but without the mat surrounding all. It was left out in Figs. III. and V. in order to show the position of the ropes and staves). If the plant has to be conveyed to a distance, it is necessary to be provided with a low broad-wheeled transplanting-truck, Fig. IV.

The surface of the truck must be strong, and made to extend a little over the wheels on each side. Such a machine as that used by masons for carrying large stones from place to place is preferable, owing to the ease by which it can be made to turn. The wheels had better be of solid wood-work, not less than five inches broad, and surrounded with a broad iron hoop, thus rendering it less liable to injure garden walks. Several strong rings should also be placed about it, in order to secure the plant by ropes if required, particularly while going over an irregular surface.

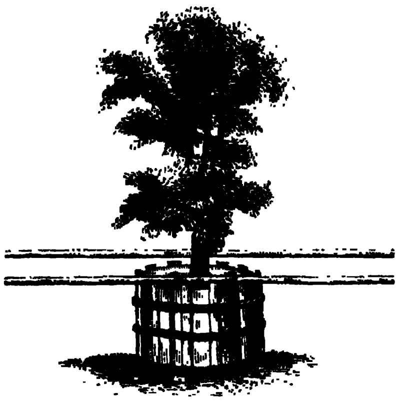

FIG. III.

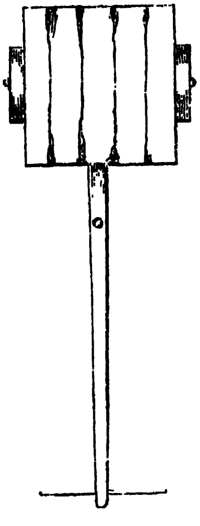

FIG. IV.

Supposing the plant brought to a situation where it can be easily got upon the machine, the handle must be raised up so as to make the back part of it touch the ground; the plant is then to be raised on, and the handle or shaft gradually lowered, keeping sufficient strength behind to prevent the plant being upset while bringing it to a level. Fig. V. represents a plant so placed on the truck. After being secured, the handspikes may be taken out, and the ends of the ropes firmly secured to the upright staves or spars.

After being properly secured, little difficulty will be found in transplanting it to its intended place of reception. Previous to its being removed, the hole or pit into which it is to be placed ought to be in readiness, and at least four feet larger than the diameter of the ball of earth and roots to be placed into it. A sloping bank must be formed from the surface of the ground to the bottom of the pit, the machine with the plant must then be brought as near to the edge of the slope as possible, and placed with the back part of it to the pit. After the ties have been unloosed which fixed the plant to the machine, replace the handspikes and equally adjust the strength as before, placing one or two men to steady the top of the plant. All being in readiness, raise up gently the shaft of the machine, and the mass will be easily slipped to the ground. This done, unloose the ties of the outer mat, and raise the plant with the handspikes sufficient to draw the mat from beneath; then slip the plant gently down the inclined plane into the pit. If possible, prevent it from being dragged down, as it is apt to take in a quantity of earth, besides displacing the bottom boards, and the risk of loosening the whole mass.

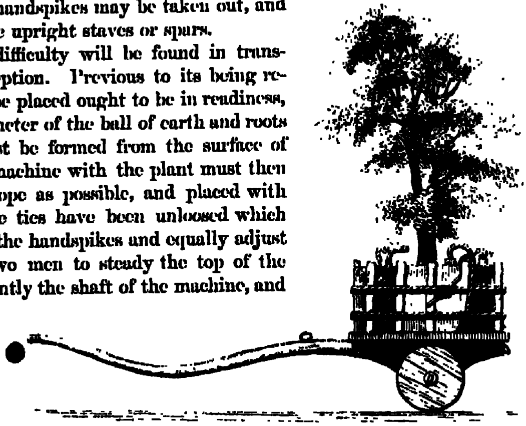

FIG. V.

If the ball of earth enclosing the roots happen to be too heavy to be lifted upon the transplanting truck at once, it may be put on in the following manner:—After the plant has been raised, and resting on the surface of the ground, a slope can be cut in the earth close to where the plant is standing, sufficiently wide to allow the transplanting truck to be let down on planks previously laid for the purpose, and of such a depth behind, that the back part of the truck shall be on a level with the surface on which the plant is standing. When so arranged, the plant can be worked upon the truck, and then drawn to the surface of the ground.

Fig. VI. represents a plant ready to be placed on a truck.

If the tree or shrub intended to be transplanted happen to be growing on a sloping bank, it is easily got upon the truck by cutting a trench into the bank where the plant is standing; and if its destination happen to be on a sloping bank, a trench can be cut so as to allow the truck to be run back; the plant can then be slipped off the truck on a piece of ground previously prepared for its reception.

[We are indebted to our kind friend, Mr. M'Intosh, the Horticultural Editor of the *North British Agriculturist and Journal of Horticulture*, who kindly lent us the engravings, for an opportunity of extracting this useful and interesting article.]

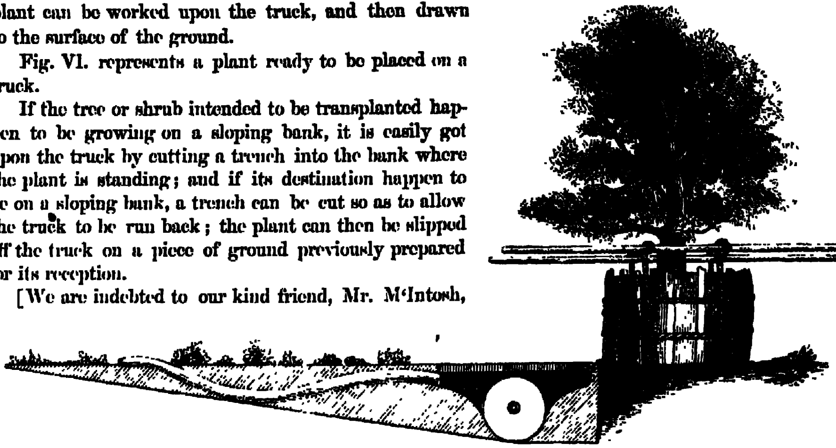

FIG. VI.

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Miscellaneous Notice.

Horticultural Society, October 1*st.*—At this meeting, the principal features of attraction were some very beautiful Dahlias, from Mr. Turner, of the Royal Nursery, Slough; and a tolerable collection of fruits. From the Royal Gardens, Frogmore, Mr. Ingram sent a remarkably handsome Cayenne Pine, weighing 7lbs. 9ozs., beautifully swelled, and what is very unusual, ripened nearly perfectly to the top. From the celebrated Vine at Cumberland Lodge, Mr. Ingram sent some very fine Black Hamburgh Grapes; this Vine is perhaps the largest plant in England, as it fills an entire house of considerable length, and has about eighteen hundred bunches upon it at the present time; the stem of the Vine is two feet nine inches in circumference at the base. Mr. Forsyth, gardener to Viscount Barrington, sent some excellent Black Hamburghs, a little injured by travelling; and good Grapes of the same kind came also from Mr. Rust, gardener to J. McLean, Esq.; and Mr. Agent, gardener to W. M. Webster, Esq. Mr. Ferguson, of Stowe, produced some Dutch Hamburghs, finely swelled and well coloured. From Mr. Fleming, gardener to the Duke of Sutherland, were some Black Grapes, called the Mill Hill, a distinct Hamburgh-like kind, with very large berries, said to be a cross between the Dutch Hamburgh and the Black Damascus; it is an excellent flavoured kind, and is said to be very suitable for winter purposes, as it is a good keeper. With it was a bunch of the Dutch Hamburgh, badly coloured, but said to be the true variety. Pines were sent by Mr. Ward, gardener to W. Stevens, Esq., a Globe, weighing 4lbs., and two Envilles, weighing, respectively, 4lbs. 4ozs., and 5lbs. 2ozs. A small half-starved looking Queen Pine, said to have been ripened in the open air, was sent from C. Child, Esq., of Bromley.

Of novelties the most remarkable was Lapageria rosea, from Messrs. Veitch and Son, a bright rose-coloured lily-like climbing plant, from Chiloe, which will prove to be a plant of very considerable interest should its native habit of blooming be attained in this country. A plant of the same kind was also produced by — Myers, Esq., of Barnet. Messrs. Jackson and Son sent six nicely grown plants of Odontoglossum grande, which proves to be a remarkably free blooming species. From Mr. Franklin, Mrs. Lawrence's gardener, we observed a small collection of Orchids consisting of Vanda suavis, Miltonia Clowsii, Lælia Perrinii, Cattleya bicolor, remarkably well coloured, with Oncidium Papilio, and a species of Odontoglossum from Costa Rica. Mr. Young, of the Milford Nursery, Godalming, sent two plants of Cryptomeria japonica, thickly covered with seed cones, proving that this interesting plant must soon become common in the country. Among Mr. Turner's Dahlias, we noticed, of new kinds, the following—Nepalese Ambassador, Nil Desperandum, a brilliant thing, and a pretty fancy flower called New Standard. J. Edwards, Esq., produced a seedling called Mrs. Hansard; and Mr. Bragg, of the Star Nursery, Slough, also sent the Hon. Mrs. Ashley, a lovely thing, with Admiral and Commander. The same gentleman also sent a collection of Hollyhocks. An egg-shaped Gourd, called Cucurbita ovifera, one of the best cooking kinds, was sent from Mr. Reeves, gardener at Clapham; and a dish of Peaches from Mr. Myers, of Brentford.

From the garden of the Society were sent two kinds of Peaches, the Barrington and Chancellor, and some plants, the most remarkable of which were Angelonia moschata, Aphelandra cristata, Lilium speciosum rubrum, Epacris miniata, and two fine plants of Sedum Sieboldii.

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New and Rare Plants.

Catasetum Warczewitzii, *Lindley*. Warczewitz's Catasetum (*Paxt. Fl. Gard.*, i., 46).—Nat. Ord., Orchidaceæ § Vandeæ-Catasetidæ.—Syn., Warczewitzia sp., *Skinner*.—A singular and fragrant stove perennial herb, the flowers of which grow in a short close pendulous raceme, and are deliciously fragrant; the sepals and petals are roundish ovate, the lip helmetted, spread into a thin three-lobed limb, the centre lobe of which divides into two diverging fringes; they are pale green with bright emerald green veins. From Panama. Introduced in 1848, by Mr. Skinner. Flowers in spring. J. D. Llewellyn, Esq.

Lælia grandis, *Lindley*. Large-flowered Lælia (*Paxt. Fl. Gard.*, i., 60).—Nat. Ord., Orchidaceæ § Epidendreæ-Læliadæ.—A curious stove epiphyte, with the habit of Cattleya. The stem is club-shaped, monophyllous, the leaf coriaceous, broadest at the base The flowers grow in pairs, sub-horizontal; the sepals and petals nankeen coloured, lance-shaped, two inches long, the former reflexed, the latter parallel with the lip, which is undulated and three-lobed, the lateral lobes convolute; it is white, washed with rose at the base inside, marked with purple veins, and having a pure white border. From Bahia. Introduced to Paris by M. Morel. Flowers in May.

Audibertia polystachya, *Bentham*. Many spiked Audibertia (*Journ. Hort. Soc.*, v., 192) -Nat. Ord., Labiaceæ § Monardeæ.—A herbaceous hoary tomentose perennial, of sage-like aspect, with snow-white stems and leaves; the former growing erect about two feet high, the latter, oblong, obtuse, long-stalked, with crenated margins, and having a strong and not very agreeable odour. The labiate flowers grow on short lateral one-sided racemes, forming an elongated panicle, and are white, and very numerous, but of "no beauty." Worth growing for the sake of its leaves, where the climate suits it, but it is not hardy in that of London. From California. Introduced by Mr. Hartweg, in 1848. Flowers towards autumn. Horticultural Society of London.

Libocedrus tetragona, *Endlicher*. Tetragonal Libocedrus (*Paxt. Fl. Gard.*, i., 47).—Nat. Ord., Pinaceæ § Cupresseæ.—Syn., Thuja tetragona, *Hooker;* Juniperus uvifera, *Don.*—A magnificent evergreen tree, fifty to eighty feet high, probably as hardy as *Araucaria imbricata*. The young branches are clothed with small thick green scales, placed in four rows, and having a more massive appearance than is usual among the scale-leaved conifers. The cones are small, formed of two pairs of unequal sized scales. From South America, just below the snow line of the Andes of Patagonia. Introduced in 1818. Messrs. Veitch, of Exeter.

Boronia spathulata, *Lindley*. Spathulate-leaved Boronia (*Journ. Hort. Soc.*, v., 142)—Nat. Ord., Rutaceæ § Boronieæ.—Syn., B. mollina, *of gardens*.—A small erect greenhouse shrub, having a heavy unpleasant odour, like that of Rue, and small flowers not showy. The branches are compressed; the leaves dull olive green, simple and smooth, roundish obovate on the early branches, narrower and spathulate on the later ones. The flowers are small, in terminal cymes, and of a pale pink colour. From Australia: Swan River. Introduced in 1848. Flowers in spring.

Boronia tetrandra, *Lavillardiere*. Tetrandrous Boronia (*Paxt. Fl. Gard.*, i., t. 8)—Nat. Ord., Rutaceæ § Boronieæ.—Syn., B. pilosa, *Labillardiere;* B. microphylla, *of gardens*.—A neat greenhouse shrub, rather pretty, but too pale in the colour of the flowers to become a very showy plant. It is a dwarf branching bush, not unlike a dwarf B. pinnata. The leaves are pinnate, with (usually seven, sometimes five or nine) narrow blunt leaflets, which have a rather agreeable smell. The flowers are axillary, pale pink, rather large, but seldom more than one at a time in each axil. From New Holland. Introduced about 1848. Flowers in spring. There are five named forms of this species—*floribunda*, *terminiflora*, *grandiflora*, *laricifolia*, and *pilosa*. The plant in English gardens, is not exactly like any of them, but most like *grandiflora*.

Stanhopea ecornuta, *Lemaire*. Hornless Stanhopea (*Flore des Serres*).—Nat. Ord., Orchidaceæ § Vandeæ-Maxillaridæ.—A stove epiphyte, with the general habit of the Stanhopeas. The flowers grow in pairs, they are four inches and a half across, pure white, with a few purple spots near the base of the petals, which are short, firm, concave, and not reflexed, as in most other Stanhopeas; the lip ovate, obsoletely triangular, very short, having much the form of a slipper, extremely fleshy, of a very bright yellow-orange colour, passing towards the point into pure white, and mottled on its sides with handsome purple blotches. From Central America. Introduced to Belgium about 1848. Flowers ?

Ternströmia sylvatica, *Chamisso* and *Schlechtendahl*. Wood Ternströmia (*Journ. Hort. Soc.*, v., 141).—Nat. Ord., Ternströmiaceæ—Syn. T. lineata, *De Candolle*. A small evergreen branching greenhouse shrub, unimportant to cultivators. The leaves are two to three inches long, alternate, oblong lanceolate, acuminate, dull green above, paler beneath, quite smooth, and somewhat leathery in texture. The flowers are small, axillary, growing singly on short curved stalks; they are about half an inch in diameter, creamy-white, and when fresh, have an agreeable hawthorn-like scent. From Mexico. Introduced by Mr. Hartweg before 1848. Flowers early in spring. Horticultural Society of London.

ACANTHOLIMON GLUMACEUM.

Nat. Order, PLUMBAGINACEÆ.

GENERIC CHARACTER.—Acantholimon, *Boissier*. *Calyx* funnel-shaped, tube narrow; limb scarious, multiplicate, five-nerved, shortly five-lobed. *Corolla* gamopetalous only at the very base, forming a ring, the petals free in the rest of their extent, with long claws; the margins of the claws contiguous so as to form a kind of tube; limb spreading. *Filaments* sub-dilated at the base, adherent to the base of the corolla, free above. *Ovary* cylindrical-linear, attenuated into the styles; *styles* five, coherent together at their bases, then free, glabrous, shorter than the stamens; *stigmas* capitate-depressed, sub-discoid, sub-vertical by the bending of the apices of the styles. *Utricle* crustaceous-membranous, linear-cylindrical, acutely five-sided throughout its length, bursting (circumscissilly) by an elongated conical lid formed by the bases of the styles, and also splitting irregularly into valves at the angles.—(*Boissier in De Cand. Prod.*, Part xii.)

ACANTHOLIMON GLUMACEUM, *Boissier*. Glumaceous Acantholimon, or Prickly-Thrift.—Green; branches naked at the base, clothed with old deflexed leaves above, the yearling shoots rhombiform, crowded with leaves; leaves all nearly equal, acerose, the lowest flat, spreading-recurved, the rest subulate, three-sided; scape with a minute short pubescence, twice or three times as long as the leaves, two-ranked; spikes sub-sessile, very short, compressed, densely seven- nine-spiculate; bracts rather broad, sub-equal, longer than the tube of the calyx, the midrib excurrent, forming a longish acerose mucro, the lower becoming blackish, ovate, broadly scarious at the margin; limb of the calyx unarmed, traversed by blackish violet veins.

SYNONYMY.—[?] Acantholimon glumaceum, *Boissier, in De Cand. Prod.*, xii., 620. Statice Ararati *of gardens*.

DESCRIPTION.—A dwarf perennial herb, with crowded, short, grassy foliage, the leaves rigid and armed with sharp spines. The annual shoots bear an elongated, closely imbricated, spreading, and recurved tuft of leaves above, and are clothed below by withered leaves, loosely imbricated. The flowering stems, 2-3 times longer than the leaves, are axillary, rigid, curving upward, and bearing a few distinct membranous scales. Spikes distichous, with lanceolate ovate bracts, green at the back, and with broad membranous margins; the mid-nerve running out into a slender hard prickle; spikelets densely imbricated. Calyx bell-shaped, from a narrow tube, white and membranous, with five blackish purple veins, scarcely notched at the border, much plaited. Corolla rose-coloured, the limbs of the petals large, as long again as, and surpassing in almost their whole extent, the expanded part of the calyx. Leaves, flowering stems, pedicels, and bracts clothed with a fine pubescence.

HISTORY, &c.—The present plant appears to agree best with the above description, taken from Boissier's monograph of the Plumbaginaceæ, in De Candolle's *Prodromus*; but it appears to us that he has broken up the species far too much, which renders it somewhat difficult to decide without examination of authentic specimens from himself. It is known in gardens under the name of Statice Ararati, whence derived we know not. Acantholimon glumaceum is stated to be a native of Armenia. The plant has been cultivated in the neighbourhood of London for the last five or six years. Its common garden name would appear to favour the notion of its having originally been brought from the mountains of Armenia, whence the Acantholimon comes.—A. H.

It blooms freely in the months of June and July, and when growing in a good sized mass, is rather showy, remaining a considerable time in blossom.

CULTURE.—Our present subject is a little alpine perennial, perfectly hardy in the climate of London, and from its habit of growing into dense tufted masses, it forms a very pretty ornament either for the flower-border, or for out-door rock-work, as well as for pot culture. It is cultivated with facility in the ordinary way in which alpine plants are managed, and is propagated readily by means of cuttings of the young shoots, placed until rooted in a moderately warm and close atmosphere, and subsequently hardened off when fully established.

It prefers a rich moderately light loamy soil, when planted out. Cultivated in pots among other "alpine" plants, it accommodates itself perfectly to the usual treatment given to these "flowers of the sod."—M.

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ON THE CULTURE OF CAPE BULBOUS IRIDACEÆ.

BY MR. M. SAUL, GARDENER TO LORD STOURTON, ALLERTON PARK, YORKSHIRE.

TO this order belong the genera, Gladiolus, Ixia, Sparaxis, Tritonia, Watsonia, Babiana, and Anomatheca. They are generally called Cape bulbs. It is matter of surprise that these charming plants, so beautiful, and abundant in their flowers, and of so easy culture, should be so very little grown. Many of the kinds will stand the winter in the open ground, if covered with tan or a little dry litter. I remember having seen some years since, several beds of these truly delightful genera in full flower in the open garden; they were protected from the north by a wall, behind which grew a row of trees. Since then I have seen many hundreds of flower-gardens in different parts of the country, and I may perhaps be thought singular in my opinion, when I declare that I have never witnessed anything to equal the beauty and grandeur of that display of Cape bulbs. I have seen flower-gardens perfectly dazzling with colours—with scarlets, yellows, and blues of every shade; but in beauty how much do they yield to many charming kinds of Gladiolus, Ixia, Sparaxis, Tritonia, Watsonia, Babiana, and Anomatheca, the delicacy, variety, brilliancy, and distinctness of whose flowers render them so peculiarly attractive. There is only one drawback to their extensive cultivation; and that is, they do not remain long in flower. On this account they will never occupy a prominent position in flower-gardens. But there are very few places, however limited, in which a border of some kind, might not be devoted to their growth. I know no plants that I would sooner give up a south border to, than these Cape bulbs.

When they are grown in the open ground, I would recommend a south border, sheltered by a wall on the north side. It should be well drained, as nothing is so very prejudicial to bulbs of any kind as a wet bottom. The soil should be turfy loam, peat or leaf-mould, and a little sand. The bulbs should be planted about six inches deep, and this may be done any time in October. The surface of the soil should be covered with a few inches in thickness of tan or dry litter during the winter, always removing it as soon as fair weather sets in in the spring.

When grown in pots, the same description of soil will suit them. They should be potted in October, and placed in a cold frame or pit, and protected from the frost. They will require little or no water during the winter, nor until they begin to grow in spring. When they have made a little growth, they should either be planted out in a warm south border, or be placed on the shelves of a greenhouse, or in any other situation where they will have plenty of light and air. They should be regularly attended to in watering, and in due time they will reward the cultivator with the charming variety, beauty, and splendour, of their delightful flowers. The bulbs, whether in doors, or out, should be kept in a growing state, until the foliage naturally shows symptoms of maturity. Water must then be gradually withheld from them. When in a state of rest they should be kept quite dry, until the season of their growth comes round.

Some attention has been paid of late to the genus Gladiolus, and the result has been, that we now have some splendid kinds in cultivation. I wish I could say the same of each of the other genera I have enumerated, for I feel assured they would amply repay any labour or pains bestowed upon their improvement.

The following list [which we have ventured to extend somewhat beyond Mr. Saul's MS.] contains some of the most distinct and showy kinds of the different genera of Cape bulbous Iridaceæ: a few of them are probably lost to the country; but their beauty renders their re-introduction—a matter of little difficulty—highly desirable:—

ANOMATHECA :—
- cruenta.

BABIANA :—
- angustifolia.
- disticha.
- purpurea.
- ringens.
- rubro-cyanea.
- sulphurea.
- Thunbergii.
- villosa.

GLADIOLUS :—
- blandus.
- Brenchleyanus.
- cardinalis.
- carneus.
- floribundus.
- formosissimus.
- Gandavensis.
- imperialis.
- insignis.
- namaquensis.
- pudibundus.
- pulcherrimus.
- ramosus.
- recurvus.

IXIA :—
- aristata.
- aulica.
- capitata.
- conica.
- crateroides.
- erecta.
- lilacina.
- maculata.
- monadelpha.
- odorata.
- patens.

LAPEYROUSIA :—
- corymbosa.

MORÆA :—
- ciliata.
- edulis.
- ramosa.

SPALANTHUS :—
- speciosus.

SPARAXIS :—
- bicolor.
- fragrans.
- grandiflora.
- „ striata.
- stellaris.
- tricolor.
- versicolor.

STREPTANTHUS :—
- elegans.

TRICHONEMA :—
- roseum.
- speciosum.

TRITONIA :—
- aurea.
- crocata.
- deusta.
- fenestrata.
- fucata.
- lineata.
- squalida.

VIESSEUXIA :—
- glaucopis.
- Pavonia.
- villosa.

WATSONIA :—
- aletroides.
- angusta.
- brevifolia.
- fulgida.
- marginata.
- Meriana.
- roseo-alba.
- spicata.

THE COURSE OF THE SAP IN PLANTS.

By J. TOWERS, Esq., C.M.H.S.

TO bring to a close the question of the positive descent of the sap by gravitation or otherwise (a phenomenon which appears by the strictest analogy to have no real existence), the following passage is extracted from the article by Dr. Henslow already alluded to:—"That superabundant development of new matter which takes place round the edges of a wound, forming a swollen border, may probably arise from some additional stimulus produced by the morbid condition under which the tissue is placed. Thus the expansion of galls, and other excrescences, is induced by punctures and injuries at particular spots, and exhibits the results of a morbid action to a greater extent than we see in the edges of such wounds as are inflicted by pruning." Perhaps here, as in the case of ligatures also, where the upper edge of the bark becomes more enlarged than the lower edge, "a greater energy may sometimes be exerted by the developing forces in a downward direction than in an upward, and yet this may be quite irrespective of the course of the sap."

Some years ago, a case in point occurred, where a ligature of thin iron bell-wire was passed round a lateral branch of a pear tree that projected too much over a walk; this branch was drawn up, and kept in the required position by the wire, which was attached to another and stouter part of the tree. The ligature was forgotten, but a large crop of fruit, in a future season, requiring to be thinned-out, an attempt was made on the bough in question, which, however, snapt short off at that place, when it was seen that the wire had entirely prevented the enlargement of the wood, which was scarcely thicker than a quill, a burr of cortical matter having formed at the wound, which buried and entirely concealed the wire.

The effects produced by the operation of "*budding*" will throw some light upon the courses of the sap. As a familiar example, we will appeal to the budding of the Rose. Without pretending to discuss the "vexed question"—whether the shield of bark, with its bud, should retain its strip of alburnous wood, or be totally deprived of it, even to the slightest fibre, provided always that the root of the eye that is by nature attached to the alburnum, and through it to the medullary sheath, remain entire—sound theory demands:—First, that the bark of the stock should detach itself freely from the sap-wood beneath it, and show the exposed surface to be rich in that proper laborated fluid, called by some physiologists cambium—identical with that organizable matter, the vital envelope or indusium of the late Mr. Main, who thus described it in his *Illustration of Vegetable Physiology*:—"This slender body of vitality, or vital envelope, is constitutionally compound, not simple as such a thin tissue may be supposed to be, containing the rudiments of both root and buds; and, moreover, is the source of all accretion, whether as to magnitude or number of the parts produced." The second theoretical condition is like the first—it claims that the bark and young wood of the strip detached, should separate, or be capable, from existing moisture, of being separated with a facility equal to that which is found to exist in the stock wherein it is to be inserted. But this is not all; we have now to consider how, and by what instrumentality, two distinct bodies, both, however, imbued with a principle of life, shall unite and form an entire and perfect plant—perhaps ultimately an enormous tree from the progressive developments of a tiny eye or bud, not the size of a radish-seed at the time of its insertion; but yet, in all those developments, retaining its distinctive integrity of character.

The late Mr. Knight, while tracing the results of budding, observed that "the wood formed under the bark of the inserted bud unites, confusedly indeed, with the stock, though still possessing the character and properties of the wood from which it was taken, and exhibiting layers of new formation, which originate evidently in the bark, and terminate at the line of union between the graft and the stock." Again, Mr. Knight observed, "that if a portion of a stem be stripped of bark, so as to leave the surface of a small portion of the sap-wood (alburnum) uncovered, the wound will heal, first by means of new bark issuing from the edges, and gradually narrowing the extent of the wound; and then by the production of new layers of wood formed under the bark as before. The new wood will not, indeed, unite with the portion of alburnum that had been exposed to the air; but it will exhibit, on a horizontal section, the same traces of divergent layers as before, extending from *the bark in which they originate*, to the lifeless surface of the old wood." The phraseology of this last paragraph is Keith's, in his commentary upon Knight's experiments, which had induced that profound physiologist to substitute the word "convergent" for that of divergent, medullary processes.

When a bud is inserted, adroitly as to manipulation, in accordance with correct theory, the juicy surface of its bark, and that of the alburnous wood of the stock, become attached together by the compressive force of the ligature, as does a boy's leather sucker by the expulsion of the air between it and a stone beneath it. But in the bud and its living bark there exists a vitalized fluid which, conjointly with that on the exposed alburnum of the stock, becomes gradually organized, a convergent system of horizontal processes passing simultaneously toward, if not into, the tender alburnum. The union thus effected, the bud in process of time sprouts, receiving according to its requirements, the current of raw sap that ascends through the stock, which sap is subsequently elaborated in the leaves, and returned in its appointed course, through the channels of the new bark, whence the convergent processes convey it, horizontally, towards the pith.

We do not attempt to deny that portions of modified fluid are conveyed by appropriate cellular tissue in the bark, downwards; but from every fact actually observed, or applied analogically, we do conscientiously repudiate the idea as false and delusive, that the sap which has once ascended from the roots, ever does again descend by a gravitating power like that of water, or of the quicksilver in the tube of a barometer; or, again, that there exists in the vital fluids of a plant any motion which corresponds with that of the blood in animals—of propulsion through the arteries, and of return through the veins. Other subjects of deep interest in physiology suggest themselves, connected with the progressive development of grafted and budded plants.

VISITS TO REMARKABLE GARDENS

REDLEAF.—W. WELLS, Esq.

PASSING from the station on the South Eastern Railway to the village of Penshurst, about midway between the two points, on the right hand side of the road, will be seen, embosomed in trees, a small unpretending brick built mansion, which a stranger would pass by almost without notice. Pass, however, a few yards south of the house, through the shrubbery belt, as we did in the early part of June last, step a few yards over the velvet turf, behold the Azaleas and Rhododendrons in their golden and bright empurpled glory; and, oh enchantment! say you have seen one of the brightest spots on the earth's surface; a spot as rich in picturesque beauty as it is in the exhibition of the refined taste and artistic skill of its late proprietor. But we must enter with becoming humility, for we are at Redleaf, and hence we will pass to the gardener's cottage. Here we found our indefatigable friend and contributor, Mr. Cox, who kindly conducted us over the garden, and who pointed out and detailed the history of many of its most attractive features.

The late Mr. Wells, the founder of this admirable place, was long very favourably known as one of the leading patrons of horticulture in England; and Redleaf, through the late Mr. Loudon, has long been known throughout the civilized part of the world as, *par excellence*, one of the best gardens in England. Situated upon the side of a hill, and commanding a most extensive view over one of the richest and best wooded parts of Kent, Redleaf, in a horticultural view, has many points of surpassing interest. The estate, which is finely timbered, too much so in some parts, has a diversified and very undulating surface; and, in forming the garden, advantage has been taken of this, to enhance the natural features, and to improve and blend the artificial parts with them.

We entered first by the Dutch garden, a plan of which is given at p. 140. This, at one time, was a farm-yard, the greenhouse being the barn, and the garden the feeding-yard for stock. At the present time the greenhouse is thatched with reed, and that is perhaps the only feature by which the former use of the premises could be suspected. The bailiff's house, one of those cold, cheerless places which characterise some country scenes, has been converted into a billiard-room, and to make it harmonize externally with the garden, &c., a raised rustic veranda, covered with climbing plants, and paved with blocks of wood, has been formed. This garden is surrounded by, and parted from the English garden, to be noticed presently, by belts of American plants, among which are some of the finest hybrid Rhododendrons and Azaleas in the country, and some fine specimens of Pæonia Moutan. As an example of the possibility of converting premises apparently useless to good purpose this is a remarkable instance; but when we recollect that Mr. Wells was a gentleman of very remarkable and refined taste, our wonder at the farm-yard being thus converted ceases. It is, however, worth recording for others to profit by.

Leaving this garden we pass, by a covered way, under a canopy of Wistaria and other climbing plants, to the English garden, passing the fernery partly shaded by the covered way, and showing a goodly collection of those admirable and elegant plants in rich luxuriance. A view of this fernery is given at p. 44, accompanied by some interesting details connected with the management of Ferns, by Mr. Cox. We have seldom seen cultivated ferns in such wild luxuriance, and this no doubt is attributable to the site chosen, and to the mound being sufficiently large to admit of each kind being properly placed, and so as to receive the necessary amount of light and shade, heat and moisture.

The conservatories are situated in the kitchen-garden, and though not of remarkable construction,

contain some fine plants, more especially the huge Camellias, covering the back wall, and a few very good greenhouse plants. among which some Azaleas, Boronias, Aphelexis, and Pimeleas were the most remarkable. We must not, however, pass over a large and rich collection of Calceolarias, principally of the herbaceous kinds, for though there were few that would please the fastidious florist, there were hundreds that gardeners or nurserymen, requiring plants for decorative purposes, would be glad of. Some of the flowers were very singularly marked; others had horn-like protrusions upon the upper lip, which gave them an unusual appearance, and nearly the whole were beautiful.

In one of the vineries a fine crop of Grapes was ripening; but, from the Vines being old and very deeply planted, Mr. Cox had some doubt of the crop coming to proper maturity. He was, however, adopting the only means left to him to ripen them properly—viz., giving abundance of air to maintain a free, healthy atmosphere. In this house were also some Ferns, a few Orchids and stove plants, the supply of the conservatory rendering it necessary to keep some here, but Mr. Cox was quite aware they were bad neighbours for his Grapes; and, had circumstances admitted of it, would gladly have been rid of them. The kitchen-garden is small, and on a hanging level to the south-west; and, being well protected by a plantation on the north-east side, it is warm, and consequently produces fine crops of both fruit and vegetables. Some of the Peaches and other stone fruit-trees, show the havoc which time has committed upon them, but still they bore fine crops, and the Pear trees were completely laden with fruit, so much so, as to require considerable thinning. Cherries grow here to great perfection, some of the wall kinds being of remarkable size. The soil in the garden is rich and deep, the substratum being red sandstone, and consequently both fruit and vegetables are grown to great perfection. In the frame-ground we observed good crops of Melons and Cucumbers, and in some of the pits young specimens of greenhouse plants were growing very robustly.

The English garden, thus called to distinguish it from the Dutch, and the Rocky garden to be noticed on a future occasion, is situated between the two, and may be said to be an episodical link between the stiff formality of the Dutch, and the wild character of the Rocky garden. The boundary border of this garden is rich in herbaceous plants, more especially of the bulbous kinds, and a sort of chain of oval beds, too large by the by for the space, are gay with summer bedding plants. In this garden the Fernery and Wistaria-covered path before noticed are situated, and form very interesting parts of it. Here also some of the rock, peculiar to Redleaf, presents itself, for it crops out in certain parts of the grounds, and only requires to be uncovered to represent what never can be imitated, viz., natural rock scenery. As will be seen by our engraving, there is situated on this rock a rustic summer-house, rustic in so far as it is formed of wood; but it bears the impress of *art*, and when closely examined of high art too; indeed, it is the neatest thing of the kind we ever met with. It was formed we believe by the late Mr. Wells, and a country carpenter. Over the rock, the roots of some of the trees, the large Oaks especially, present themselves in a very picturesque manner; indeed, though surrounded by many features highly artistic, many of the best features of the pleasure-grounds at Redleaf are natural, and bear evidence of their origin so unmistakably, as to be additionally interesting on that account. Upon the grass in this garden are distributed some Chinese porcelain vases, containing specimen plants, such as Fuchsias, &c. Valuable as they may be, we cannot say we admire them; in a scene supposed to be purely English, they are out of character, and ought to be removed. Upon the grass also are placed some promising specimens of Berberis, Araucaria, and Cedrus, the only fault of which is, that they will soon become too large for the space they are destined to occupy. This unfortunately is a fault throughout the place, as most of the choice plants, more especially the specimens of Pinus, have been planted much to near together.—A.

Review.

A Treatise on the Theory and Practice of Landscape Gardening, adapted to North America, with Remarks on Rural Architecture. By A. J. DOWNING. London: Longman and Co.

THE progress of civilization in all countries has been characterized by an equally advancing taste for the higher refinements of social life. The age of chivalry was distinguished by the gratification of animal pleasure and manual prowess. The age of peace, by the development of the human mind, as exemplified in the vast amount of scientific discovery and mechanical invention, of which all civilized nations afford abundant examples—as evidenced in our modes of transit, in our manufactures, in our buildings, and lastly in our parks and gardens. England, the richest nation on the globe's surface, and because also of her isolated position and her maritime prowess, has been left at leisure to enjoy her wealth and promote those sciences which immediately relate to a life of luxury and social refinement. Let us stop for a moment and cast a retrospective glance at the state of gardening in the earlier periods of the world's history, and let us also compare those gardens, the gardens of mighty kings and emperors, with those in this country—a country of taste, wealth, and refinement—as set apart for the enjoyment of the monarch or her lieges. Solomon, the Jewish king, a man of wealth and great taste, did not neglect this important appendage to his enjoyments. He gardened on a large scale, introduced lakes of great extent, all for the enjoyment of himself and subjects:—"I made me gardens and paradises, and I planted in them all kinds of fruit trees. I made me pools of water, to water with them the groves flourishing with trees." The kings of Persia were celebrated for their extensive and beautifully arranged gardens; for, according to Pliny, they had in them buildings for repose and banquetings, fountains for cooling the air, aviaries for choice birds, and towers for the sake of distant prospect. The gardens of the Athenian and Roman governors were not less remarkable for their grandeur of conception and decorative characters. Let us, however, come down nearer our own time, and consider the provision made by the sovereigns of Europe for the enjoyment of themselves and subjects; for almost in every instance these are not set apart for the gratification of the prince exclusively, but for the great body of the people likewise. Take for examples, for their extent and magnificence, the gardens of the Caserta near Naples; the Royal Gardens at the Hague; those in France at the Tuileries, the Luxembourg, St. Cloud, and Versailles; in Austria, at Schönbrunn near Vienna; at Potsdam near Berlin; at Munich in Bavaria; the Imperial Gardens at St. Petersburgh, and, in fact, as an appendage to every palace where a kingdom or principality exists in Europe, and that, too, on a scale commensurate with their greatness. The greatest talent of the ages in which they were formed was called into requisition. They bear the impress of master minds; they are striking examples of the existence of principles to guide them in the development of grand ideas; their sculptural embellishments betray a taste of the most refined imaginable kind; their whole arrangement bears evidence of design. What can we say then for the royal gardens of England, which ought to be schools of improvement to guide our nobility and great landed proprietors in all that relates to the improvement and embellishment of their country residences? We have indeed the remnant left us at Hampton Court that a royal garden evincing design once existed in England; and, as if it had been a blot on our national character, the government officials are annually using their best endeavours to efface every evidence of its existence. Windsor, one of the noblest royal palaces in Europe, has capabilities unequalled in the world for the formation of a royal garden. What now exists under that name is a by-word throughout Europe, and a stain upon the national character. This is amply redeemed by the multitudes of examples, conceived on a princely style of magnificence, as carried out by the great majority of the English aristocracy; and, as our author observes, "in the United States it is highly improbable that we shall ever witness such splendid examples of landscape gardening as those abroad to which we have alluded." There can be no question whatever, but that a country of such vast extent as the United States, rising in wealth and influence with such marvellous rapidity, that the world has exhibited nothing equal to it, must one day take a high stand in ornamental gardening. Hence it is of the more importance that the infant mind of her people, (if we may be allowed the expression,) in the reception of first impressions, should have clear and precise views laid before them. The experience of the great practitioners of the old world, and the principles they have propounded, should be laid clearly before the operators of the new world. All doubts, all speculative theories, all debateable propositions, should be kept out of view—should be carefully discarded from a work, the object of which is chiefly elementary. That is what our author, unfortunately for his countrymen, has not done; too large a space of the volume before us is occupied in collecting authorities to discuss mere quibbles, while great principles—the precious fruit of the lives of such men as Uvedale Price, Repton, Gilpin, and others—are not made of sufficient import, but entrammelled in a mass of discussion which destroys their perspicuity of exposition, and consequently renders that obscure which was otherwise luminous. Mr. Downing's sin does not lie in compiling a book chiefly out of English authors, but rather from the want of judicious selection; his countrymen have little need of the husk along with the kernel. Our author has no sympathy with geometrical gardening, as "the results evince a fertility of odd conceits, rather than the exercise of taste or imagination." Hence the genius of Le Notre only exemplified "the law of fashion in the gardening taste, from which there was no higher court of appeal." It is quite certain our author would not have appealed to the Dutch school, which he characterises as a "double distilled compound of laboured symmetry, regularity, and stiffness, which seems to convey to the quiet owner so much pleasure, and to the tasteful traveller and critic so much despair!" The truth is, one kind of gardening, in the mind of Mr. Downing, is alone to be tolerated, and this he designates *the modern or English style*, which, he says, "is imbued with beauty of the most graceful and and agreeable character, based upon nature, and refined by art."

Mr. Downing hails the introduction of this modern style in glowing language, and Mr. Kent gets his full share of praise as the radical reformer of the old school. "Previous artists," he remarks, "had confined their efforts within the rigid walls of the garden; but Kent, who saw in all nature a garden-landscape, demolished the walls, introduced the *ha-ha*, and, by blending the park and the garden, substituted for the primness of the old inclosure the freedom of the pleasure ground."

It is manifest from the above *verbatim* quotations that our American friend is totally unacquainted with the numerous princely examples of the purest kind existing in England, neither does he appear to have read her best authors on this subject; if he has, it must have been through his *modern* spectacles. What says one of our best landscape gardeners (Gilpin) to such Gothic innovations upon the old school? "The modern system throws down the walls, terraces, steps, and balustrades at 'one fell swoop,' and exposes every recess of retirement, every nook of comfort, to the blast, and to the public gaze; the approach invades the precincts of the garden, which now, in spotty distinctness, is spread over a space cleared of every vestige of intricacy and repose, while a sunk fence excludes the cattle from that lawn which is *apparently open* to them, or the flimsy barrier of an iron hurdle is attached to a building whose ivied battlements have witnessed the lapse of ages. What compensation, then, does the modern system offer for the destruction of all comfort?" Sir Uvedale Price, the most profound as well as the most accomplished writer on landscape gardening in the English language, had a high reverence for antiquity; yet he sacrificed an old garden on one occasion, and wrote his own confession of the barbarous act afterwards. "I may, perhaps," says Sir Uvedale, "have spoken more feelingly on this subject, from having done myself what I so condemn in others—destroyed an old-fashioned garden. * * * I have long regretted its destruction. I destroyed it, not from disliking it; on the contrary, it was a sacrifice I made, against my own sensations, to the prevailing opinion."

It is beyond all question that the crude innovations of Kent could not long stand against the profound reasoning of Price, whose arguments are based upon the clearest principles of taste; so clear, indeed, and so classically conveyed to us, that we almost doubt—were it not that the volume before us places it beyond all doubt—that Mr. Downing could by any possibility allow such untenable opinions to go forth under his name. Every residence of dignity or of architectural pretensions requires accompaniments of a decorative and substantial character, in conformity with the magnitude of the design. Terraces, steps, balustrades, vases, fountains, and other architectural embellishments are a necessary and universal auxiliary to such mansions. Repose and security, as well as every principle of good taste, demand that these should be efficiently and distinctly protected by an architectural ornamental structure. The line of demarcation should be unequivocally defined. "But," says Gilpin, "whence this horror of a fence which good sense—a constituent part of good taste—prescribes? If it be contrary to good sense to admit the cattle on the dressed lawn, it is, I conceive, equally contrary to let it appear they are admitted," which would be the case were the *ha-ha* of Kent introduced, or the miserable subterfuge of the *invisible* fence adopted, which the modern improver so strenuously recommends. Mr. Gilpin, speaking of the division of the dress ground from the pasture beyond it, thus forcibly sums up the whole argument:—"I hold it imperious that the manorial house, either of ancient or modern date, should be separated from the pasture by a wall. I think it agreeable to good taste that a Grecian, Italian, or any other pile of sufficient character or magnitude, should also be thus accompanied. In cases where this accompaniment is not requisite, or cannot well be applied, I prefer a more solid fence to a flimsy one; and a sunk fence I hold *to be totally irreconcilable to a shadow of taste.*"

Mr. Downing considers, that in consequence of North America possessing in an eminent degree bold picturesque scenery, noble rivers, stupendous cataracts, bold expansive lakes, that any attempt at imitating, on a small scale, anything of this nature must be clearly avoided; now we dissent entirely from such views. It might as well be said, and with equal propriety, that because we have our lakes of Cumberland and Killarney, artificial water is to be excluded from the park. What would, indeed, be the aspect of our noblest country residences when deprived of their lakes swarming with waterfowl? On a small scale even, a limited piece of water accompanied with rocky decoration, judiciously planted and arranged with the hand of taste, creates, to the possessor of such, an amount of gratification for his daily enjoyment exceeding anything we can pretend to describe.

Gardening, in fact, is an art; and whether that art is exemplified on a rood of ground, or on ten thousand acres, it matters little, providing the principles of that art characterize the execution of the improvements, and the details are worked out under the guidance of a mind embued with true taste. Let us explain what we mean by the application of principles, and the exercise of taste. The former determines the position of water, the line of approach, the arrangement of plantations, the aspect of the mansion, and the appropriate situation of rockwork, &c.; the latter gives the peculiar expression of the ideas intended to be exemplified, without any violation of consistency or propriety.

> "He gains all points, who pleasingly confounds,
> Surprises, varies, and conceals the bounds;
> Calls in the country, catches opening glades,
> Joins willing woods, and varies shades from shades;
> Now breaks, or now directs, the intending lines;
> Paints as you plant, and, as you work, designs."
> *Pope.*

> "More cautiously will taste its stores reveal,
> Its greatest art is, aptly to conceal;
> To lead with secret guile the prying sight
> To where component parts may best unite,
> And form one beauteous well-connected whole,
> To charm the eye, and captivate the soul."
> *Knight's Landscape.*

Nearly two hundred pages of the volume under review are occupied in describing the various kinds of trees and shrubs suitable for ornamental planting; to those, however, who have access to *Loudon's Arboretum Britannicum*, the descriptions of Mr. Downing, in a scientific point of view, will be valueless.

The chapter on the "*Treatment of Water*" will be read with interest; for, although it is a mere exposition of the principles of Price, Repton, Gilpin, and others, it is not encumbered with any individual peculiarities, and hence this part of the work may be perused with advantage. The chapter on "*Walks*," also, is well worth consulting, although it more properly ought to have been styled, "On the Approach Road and Ornamental Drives." This is altogether treated with too much brevity; we consider it a subject of immense importance, and one which has never yet been so elaborately discussed as its importance, in relation to landscape gardening, so manifestly demands.

The remaining portion of the work is on rural architecture, chiefly borrowed from *Loudon's Encyclopædia of Cottage, Farm, and Villa Architecture*; and an appendix, principally extracts from the *Gardeners' Magazine*. – R. G.

Miscellaneous Notices.

The names of the Victoria, or Royal Water Lily.—Until quite recently this queen of the waters has very generally received the name of Victoria regia (*Lindley*), which is that which we adopted at vol. i. p. 225. It appears, however, from an account just published by J. E. Gray, Esq., of the British Museum, (*Ann. Mag. Nat. Hist.*,) that *V. Regina* claims precedence, on the ground of priority, over Dr. Lindley's name, regia. Sir R. (then Mr.) Schomburgk, who sent the first account, drawings, and specimens of the plant to England, proposed to name it Nymphæa Victoria. On its arrival here its distinctness from Nymphæa was recognised, and the name Victoria Regina was substituted by Mr. Gray, as a "simple act of friendship" towards an absent traveller, who had not the same means of comparison at Berbice which existed in London. Mr. Gray personally disclaims both generic and specific names, and considers them as belonging to Sir R. Schomburgk, "for it was he who proposed that the plant should be dedicated to the Queen." By a mistake of the engraver, the plate, published with the original account, was lettered Victoria regalis (*Schomburgk*). The name V. regia, afterwards used by Dr. Lindley, and subsequently adopted extensively, is stated to be an error of the press in the index to the Athenæum journal, in which an account of the plant had been published under the proper name of V. Regina, in a report of a meeting of the Botanical Society of London, to which body the original descriptions and drawings were sent by Schomburgk. Thus the plant had received the following names:—Euryale amazonica (*Poeppig*, 1832); Nymphæa Victoria (*Schomburgk*, 1837); Victoria Regina (*Schomb. and Gray*, 1837); V. regalis (*by error*); V. regia (*Lindley*, 1837); V. Cruziana (*D'Orbigny*, 1840). Mr. J. De C. Sowerby contends that the oldest specific name, amazonica, should be retained, or rather, he says, ought never to have been altered; this adds another *alias* —V. amazonica (*Sowerby*, 1850). We perceive that Sir W. J. Hooker now adopts Mr. Gray's views, giving "preference, in point of date, to the name Regina; but venturing to place it in the genitive case (Reginæ), as was done by the learned Dryander in regard to the Strelitzia Reginæ."

White Transparent Carrot.—The permanence of certain types of plants, commonly classed among esculents, is too generally believed. This exaggerated, not to say erroneous, opinion has been prejudicial to all attempts to improve particular vegetables. In the carrot, for instance, the variety having a white skin would seem to have been condemned for ever; except, perhaps, the white carrot of Breteuil. Yet it is clear that we do not know the innumerable atmospheric influences, as well as those which relate to situation and soil; all which may considerably ameliorate or improve the types of our commonest vegetables. With this view M. Barthel, Sen., of Mulhouse, has lately succeeded in raising a very interesting novelty in the form of a white transparent carrot. It only resembles the other white varieties in size. It is distinguished by its roots being of moderate length, its earliness, and especially by having the appearance of pure white wax overlaid with a coating of shining varnish. Its leaves are short, finely cut, the collar (formed by the stalks of the leaves) is slender and inserted in a deep cavity. In point of flavour it comes near the red varieties, a circumstance that will render the transition between the red and those commonly called white more natural.—*Revue Horticole.*

C.M. Ramsay del. & lith.

Gladiolus natalensis var Willmoreana

GLADIOLUS NATALENSIS, VAR. WILLMOREANUS.

Nat. Order, IRIDACEÆ.

GENERIC CHARACTER.—Gladiolus, *Tournefort*. *Perianth* corolline, superior, irregular; tube rather terete; limb six-parted and two-lipped, the lobes unequal. *Stamens* three, inserted in the tube of the perianth, erect or sub-secund, included or exserted; *filaments* filiform; *anthers* linear, affixed by the back above the base. *Ovary* inferior, obtusely three-sided, three-celled; *ovules* numerous, in many rows in the central angle of the cells, pendulous, anatropous; *style* filiform; *stigmas* three, petaloid-dilated. *Capsule* membranous, three-celled, loculicidally three-valved. *Seeds* numerous, pendulous, flat-compressed, winged, or more rarely globose, sub-baccate, with a loose or fleshy testa; *raphe* free within the testa. *Embryo* axile, but little shorter than the fleshy albumen, with the radicle reaching the hilum, superior. Herbs rare in central Europe, and the Mediterranean region; abundant and varied at the Cape of Good Hope; root bulbous-tuberous; leaves two-ranked, equitant; flowers secund in a simple spike, very often nodding; spathe two-valved, persistent.—(*Endl. Gen. Plant*, 1239.)

GLADIOLUS NATALENSIS, *Reinwardt*. Leaves sword-shaped, ribbed in the middle, obscurely nerved; flowers bell-shaped; outer segments broadly ovate, obtuse, and mucronulate; anterior inner segments linear oblong, the posterior obovate and convex.

SYNONYMY.—Gladiolus psittacinus, *Hooker*.

Var. Willmoreanus.—Willmore's Corn-flag. Flowers white, streaked with delicate rose-purple.

DESCRIPTION.—A perennial herb, with "bulbous-tuberous" roots, or corms, from which are produced the erect stems three to four feet in height, bearing two ranked, equitant, sword-shaped leaves, and terminated by the long crowded flower-spike. Flowers creamy white; the three upper broad rounded divisions of the perianth streaked with delicate rose-purple; the three lower narrow divisions with a strong central stripe of deep rose-purple, the same colour appearing, both internally and externally, just below the mouth of the tube of the perianth, and above its narrowed part. The individual blossoms are about three and a-half inches across when expanded, and are very numerous, forming a spike twenty inches long, of which our figure necessarily gives a very inadequate representation.

HISTORY, &c.—The very fine and distinct Gladiolus represented in the accompanying plate, was raised and sent to us, along with some other almost equally fine varieties, by Mr. Cole, gardener to J. Willmore, Esq., of Oldford, near Birmingham. They were all obtained between G. gandavensis (written Gandavi, by Herbert; and sometimes gandiensis) and floribundus, the batch of seeds from which they were produced, having been saved from each of these kinds, mutually crossed. We presume they have flowered for the first time this season. Of the beauty of the variety before us, our plate, from its limited size, can convey no adequate notion: imagine a spike, nearly two feet long, crowded with the large and delicately marked flowers, and some idea of it may be realized. We hope shortly to present figures of the other varieties which have been named, Oldfordiensis, and roseo-purpureus, the former a delicate salmony flesh colour, the latter deep rose-red, both very distinct and beautiful. G. Willmoreanus has been named in compliment to Mr. Willmore, who is well known as a liberal patron of gardening. The subjoined remarks of Mr. Cole, on the culture and hybridization* of Gladioli, will render unnecessary any remarks of our own on the subject of culture.—M.

ON THE CROSS-BREEDING AND CULTURE OF THE GLADIOLUS.

BY MR. J. COLE, GARDENER TO J. WILLMORE ESQ., OLDFORD.

THIS highly interesting family of plants, though comprehending some fine varieties, still presents a want of novelty in the late flowering kinds; and, from this cause, new varieties in this class, possessing appreciable merit, will be certainly esteemed. The fact that, comparatively speaking, there are few novelties in this section of the family, is a noticeable circumstance, considering the freedom with which they produce seeds. Hence our recent varieties—[Willmoreanus, Oldfordiensis, and roseo-purpureus, mentioned above]—will be hailed with delight, in consequence of their distinctness of colour and of marking, as compared with any of those now in general cultivation.

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* While on the subject of hybridizing Gladioli, it may be useful to some of our readers to learn the experience of the late Dean of Manchester, as recorded in the *Journal of the Horticultural Society* (1847):—"The genus Gladiolus, with the exception of the few species of which the lower lip is abbreviated, on which account these were erroneously formed into a separate genus, Anisanthus, by Sweet, is pretty uniform in the shape of the flower, with much diversity of size, colour, foliage, stature, and even seed, which last feature induced Sweet to build up another false genus, Sphærospora. Forty years ago I first crossed the large and brilliant scarlet and white Gladiolus cardinalis with the smaller, but more freely flowering, G. blandus, which sports with white, purple, and rose-coloured flowers, and (under the name of carneus, which was in truth rather a local variety of the same) of a coppery flesh-colour. The result was a fertile breed of great beauty, of which the prevailing colour was purplish roseate. Crossed again with cardinalis, it yielded florid plants, scarlet, copper-coloured, rose-coloured, white, and purple with endless variation. By a cross of the first mule, and of cardinalis itself with G. tristis, of which the flower is pale yellow with brown specks, deeper tints and rich speckling were introduced, with a difference in the foliage and seeds, the seed of G. tristis being smaller and longer, its leaves rigid and quadrangular, the transverse section exhibiting a cross. The seeds of cardinalis are like those of blandus, but larger. There can scarcely be two species more dissimilar than cardinalis and tristis in any genus which has the form of the perianth uniform, the latter having such remarkable leaves, narrow, rigid, ard erect, a slender stem, with night-smelling flowers, and the former very

What a magnificent appearance is presented by a group of Gladiolus gandavensis, occupying the back ground of an American bed, a clump on the lawn, or a place in the shrubbery border, during the months of September and October—a season when flowers are much wanted. Gladiolus oppositiflorus is also equally beautiful in its way, producing a spike of white blossoms eighteen inches long, and also blooming in autumn, when such an object has a very commanding appearance. The Gladioli have an extra claim on our attention, from being perfectly hardy; I allude now to the natalensis section, comprising the two above named, and a few other varieties equally beautiful. such as vernalis, spicatus, polystachius, pyramidalis, and ramosus, the last-named being very desirable from its dwarf habit. The new varieties above alluded to are Hybrids of the same class, raised here, and are crosses between G. gandavensis and floribundus, seeds having been saved from each, and mutually crossed. It may be well to remark the advantage which would result, if all who interest themselves in hybridizing, particularly when they are working on the first or second crosses—which, generally speaking, produce seedlings with but little variation in colour or markings, the difference being generally in the size of bloom and intensity of colour—would note the same, and report thereon; for such information laid before the public would greatly advance the objects of the hybridist, much time being frequently lost in travelling over ground already explored.

These few remarks on what is particularly wanted in this interesting tribe, recall to mind an opinion of the late lamented Dean of Manchester, who held that the cardinalis section would not cross with the natalensis section; hence his idea of subdividing them. I freely grant the difficulty, but am far from thinking it impossible to effect such a cross; which, if it could be obtained, would be productive of all that could be desired, by giving us a class of intermediate flowers that would bloom later than the cardinalis family, and earlier than the gandavensis varieties. Another grand object would also be achieved, by imparting a hardier constitution to the cardinalis section, by this means destroying the tendency to early growth, which is a point of great importance; the fact of their moving for growth so early as November rendering them particularly liable to suffer injury if they are planted out at that season; and hence the absolute necessity, if this tendency is to be overruled, of obtaining crosses with some of the hardy kinds. The introduction of the colour and markings of the cardinalis

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broad semi-recumbent glaucous foliage, and an inclined half-recumbent stem with large scarlet and white blossoms; yet the produce of these intermixed is fertile, and where the third species blandus has been also admitted into the union, it is fertile in the extreme (incomparably more so than the pure G. cardinalis), and by that triple cross the tall strong Gladiolus oppositiflorus of Madagascar has also produced offspring, which, though not disposed at present to make seed freely, has produced some this year. Again, the first of these mules was fertilized by G. hirsutus (known at the Cape by the name roseus), a plant with flowers straighter than usual in the genus, and strongly scented, the leaves hairy and margined with red. That cross has not as yet proved fertile. The same G. hirsutus was crossed by Mr. Bidwill at Sydney, where the Cape bulbs thrive more freely than here, with G. alatus (which Ecklon wished to turn off into a genus Hebea), having hard rigidly ribbed leaves, a short stem, and orange flowers. The cross-bred plants flowered here last autumn, being intermediate in foliage and flower. The only opportunity I have had of crossing G. alatus with the first-named mules was defeated, notwithstanding much precaution, through the introduction of pollen by the humble-bees, which are dangerous marplots to such experiments. The showy G. natalensis (called also psittacinus) of the Natal country, which endures more frost than any of the southern Gladioli, though it suffers much from July rains in many positions, has been freely crossed by myself, by Mr. Belfield, by Mr. Bidwill, and by cultivators on the Continent, with G. oppositiflorus, a Madagascar plant, found, perhaps, also in Caffraria, and often called improperly in the shops floribundus, an old name for a very different plant. The cross named G. Gandavi (for the adjective name Gandavensis to a garden cross is very objectionable) has been figured in the beautiful Ghent periodical work of M. Van Houtte and his fellow-labourers in botanic and horticultural science; it is there stated most erroneously to have been raised between natalensis and cardinalis; it flowered at Ghent for the first time in Europe, the soil and climate being much more congenial to Gladioli there than at Spofforth and in the west of England; but some of the seedlings raised in Devonshire and taken to Sydney had flowered earlier. Abundance of beautiful seedlings have been raised here and abroad between cardinalis and oppositiflorus, and *vice versâ*, many of which have been sent over from the Continent under the name G. ramosus, as if they were plants of a natural species. Those from abroad have generally perished soon here, the soil and climate being too damp; but my own seedlings, probably the opposite cross, have a much stronger constitution, more variety of colour, and have this season ripened much seed. This statement might, perhaps, induce the reader to think all the species easily convertible; but it is not so. If I am asked why, I can only say, that the ways of God are not as our ways, and are past finding out. The cross erroneously stated to have been made between G. natalensis and cardinalis, if not absolutely impossible, is so difficult, that repeated attempts made during successive years by myself, and by J. T. Alcock, Esq., who interested himself in this matter, and probably by many others, have all proved abortive; and no cross has been effected, as far as I know, between G. natalensis and any species from the Cape territory, although both natalensis and the Cape species mix readily with the Madagascar plant. I am now trying whether the cross G. Gandavi, being half-blood, will mingle with the Cape species, and the result is not yet quite certain. I lately set nine flowers of G. oppositiflorus with pollen of G. hirsutus. Large pods were readily produced, but unexpectedly they proved to contain only chaff and perishing kernels, the fertilization having, perhaps, extended to the seed-vessel and the outer coat of all the ovules, without having vivified them; but I believe one frosty night in August caused the failure. Five equally fine pods were produced at the same time on a scarlet ¾ cardinalis mule. Few of their ovules were at all fertilized, and the greater part of those were chaff, but a few apparently good seeds were amongst them, which will probably vegetate. G. Gandavi itself has ripened its seed three successive years, and one from the first batch of its descendants is now in flower. It preserves the cross-bred type, and might be accounted a distinct species, if I did not know that it was raised from oppositiflorus by pollen of natalensis. It reverts, however, a varieties would also be a grand point; imagine the colour and marking of Gladiolus Prince Albert, or formosissimus, in a raceme of erect flowers, like those of gandavensis or floribundus! What could be a more splendid object!

I admit there are many obstacles to prevent the accomplishment of this much-to-be-desired feature, still I think it is to be done, and would suggest that the difference of constitution should be taken into consideration. The fact of their coming from opposite parts of the Cape; and, again, elevation may have something to do with their freedom of seeding. Their general character is decidedly favourable, there being no distinctive difference between them to constitute what is generally accepted as an obstacle to the production of crosses; consequently it must be attributable to some peculiarity we are not acquainted with. Therefore I argue the necessity of looking to the habitat and locality of each plant and the probable influence it would have on them. Lastly, I would suggest the experiment—which, by the by, would be rather tedious—of taking, say three varieties of each kind—the more distinct the varieties, and the nearer the alliance, the better—and seeding them together, crossing the offspring of the six varieties with each other. Thus a series of years would be occupied before the feature would be obtained, but I think that the most feasible way of setting about to obtain it; and I believe it would be brought about by gradually imparting the constitution of the opposite parents to each other's offspring.

The cultivation of this tribe is very simple. They require a good friable loam, with an admixture of leaf mould, placing a layer of cow manure at the bottom of the bed. The natalensis varieties should be planted in March, about four inches deep, and nine inches apart in and between the rows. The early flowering kinds are best protected in pots in a cold frame during the winter months, and planted out in the spring; for their growing so early as November renders them liable to suffer injury from the severity of the winter if they are planted out at that season; hence it is advisable to pot them in the autumn, and store them in a cold frame, merely protecting them from frost.

I would strongly recommend grouping these plants, and in doing this, would recommend the late flowering kinds to be planted in the following way:—Gandavensis splendens in the centre; a row of floribundus around it; followed by the orange variety of gandavensis, polystachius, and Colvillii superba; filling up the margin, two or three rows deep, with ramosus, this being the most dwarf variety of this division of the family. This arrangement would be productive of contrast of colour, and they would be graduated in height. The early flowering kinds would have a beautiful effect planted

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little towards the male parent, the purple stripes of the female parent being less strongly marked than the original mules, and the flower is scarcely as large or bright coloured, following the course I have observed in other cases, that seedlings from a cross-bred plant by its own pollen sometimes degenerate in the size or brilliancy of their flowers.

"We must next turn to the Gladioli of the northern hemisphere, there being, however, a plant of intermediate position, G. æquinoctialis, on the heights of Sierra Leone. The northern Gladioli are all purplish, with a tendency to rose-colour, and in a few cases to blue, excepting the whitish and the white varieties. They peremptorily refuse to breed with the Cape species; and, although I will not say that the cross is impossible, I have failed in so many attempts that I have abandoned them. But although the northern species differ somewhat from those of the Cape territory, and agree with G. natalensis in a more direct presentation of the flowers to the front from an erect stalk, there are a great many different local forms of them, with a great general similarity of aspect and intermediate forms, which almost defeat the attempts to distinguish them specifically, but furnish, with a similarity of flower, a strange diversity of seed—the winged or foliaceous margin of the African species being conspicuous in Byzantinus, communis, Boucheanus, and some others; totally disappearing in G. segetalis, Fischerianus, and some others; curtailed in some varieties, and almost obsolete in others, of G. communis. The gradual curtailment of that margin in varieties of communis, as well as the close resemblance of G. segetalis to them, shows that the separation of the latter as a genus is preposterous. But there is another strange circumstance connected with them, which tends to show how species originate. G. Byzantinus will grow and increase greatly in almost any soil or situation; G. segetalis is very apt to die at Spofforth. I supposed it tender and fearful of wet. The white Gladiolus commutatus of Bouché, communis albus of the Dutch, but in truth a white G. segetalis, always dies at Spofforth. I believe they perish because the soil, however good for barley, is too light for them. Near Trieste and in Santa Maura, G. segetalis engrossed strong yellow ploughed land that lay flat and wet, and was also pestered by Aristolochia Clematitis; but G. Illyricus is only found in meadows of alluvial soil, subject to inundation; and where I saw it in flower in May, near Trieste, the sod was then three inches under water. Yet these three species require nice discrimination to separate them. Although the northern Gladioli, which conform with cardinalis, &c., as to their seed, will not breed with them, I believe, on the contrary, that there is no obstacle to their breeding with their European congeners that have round unwinged seeds. I should conceive that G. Byzantinus and communis, which have seeds like the African sorts, and are not particular as to position, are nearest to the northern Gladiolus of the oldest days; that some of its offspring, having fallen into peculiar situations, have acquired constitutional peculiarities, with some alterations of aspect and structure, that have become fixed characters.

"I have already shown that the Gladiolus crossed from G. oppositiflorus (which breeds freely with the Cape species) by pollen of G. natalensis (which will not), produces seedlings, one of which having flowered, reverted a little towards the male type. I believe all the Cape species of Gladiolus to be convertible; I have found no positive impediment. The rare G. abbreviatus might be almost made between G. cunonius and tristis; it has the curious leaf of the latter, and a flower approaching to that of G. cunonius.

"The blending of colours amongst cross-bred plants is rather capricious. The scarlet G. cardinalis with a white G. blandus, and with the yellowish G. angustus and G. oppositiflorus, gave a purplish rose-colour. G. natalensis impresses its colour much more strongly on G. oppositiflorus than G. cardinalis does, being more nearly akin; whether from that cause or not I will not presume to guess."

in the following way:—Insignis central; La Princess around it; followed by formosissimus, princeps, and Rex rubrorum; completing the bed, two or three rows deep, wtth Virgin Queen. The bloom of Gladioli here this season has been truly grand; and I am sure that if they were to be planted in masses, instead of being isolated, as is too frequently the case, they would be much more highly esteemed. The fact of their being expensive may prevent many persons from growing them; but this, I doubt not, will be soon overruled when they are brought into general favour.

In raising seedlings in an ordinary way, I should recommend sowing the seed early in the spring, in a cold frame, say about March, protecting the frame from frost and keeping it shut up for a fortnight or three weeks; in the meantime withhold water, there being sufficient humidity in the soil at that season to advance the early stages of the development of the seed; this caution is of importance at this critical period, after which, however, water may be given as circumstances may require. The frame must be kept close, giving air by degrees as the season advances, and stimulating them with heat as much as possible, consistent with the natural habits of the plant, in order to make the bulbs as large as possible the first season; this will be the means of inducing them to bloom in two years from the seed, which is a desideratum. If they are planted the second season in a frame, and slightly excited in the spring, the frame being afterwards taken away, and the little wants of the plants—as water, &c.—attended to, many of them will unfold their beauties in the course of the autumn.

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NOTICE OF SOME REMARKABLE SPECIMENS OF CYCAS REVOLUTA.

By Mr. GEORGE TAYLOR, Chatsworth.

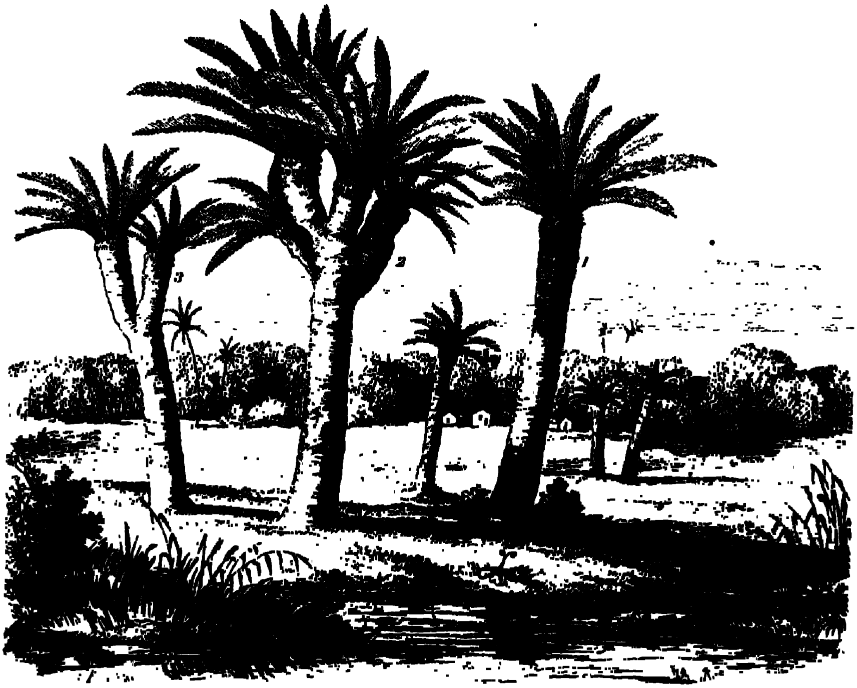
IN an article descriptive of M. Van Houtte's nursery at Ghent, recently published by Mr. Masters of Canterbury, in the *Gardener's Chronicle*, allusion is made to some remarkable Sago Palms, noticed growing in the Palm-stove of that establishment. Through the kindness of M. Regel, curator of the Botanic Garden, Halle-upon-Sale in Saxony, who introduced them to M. Van Houtte's establishment, when employed in Surinam as his botanical collector, and of M. Hermann Seitz of Munich, who prepared a drawing of them for me, I am enabled to introduce to the notice of your readers the accompanying particulars, and representation of these fine specimens which, previous to their importation, were detected growing on the site of an ancient cemetry near Paramaribo, the capital of Surinam.

It must be considered a remarkable circumstance, that infinitely more female than male plants of Cycas revoluta are known to exist, not only in the gardens of Europe, but also in their native habitat—China and Japan, where Thunberg and Siebold found the Sago Palm in its wild state; but rarely met with male plants. In European collections too, but one solitary male specimen has been recognised; it flowered in the Botanic Garden of St. Petersburgh.* Again, Mr. Regel observes, that he himself never encountered a single male plant of Cycas revoluta in Surinam; and, with the exception of one plant, which has not yet flowered, all the specimens that gentleman sent home from Paramaribo, had previously flowered,—and proved females.

Perhaps no specimens of the Sago Palm, remarkable for their great height, and extraordinary branching habitude, existing in their native climes—certainly not in Europe—can at all compare with those here portrayed, and which are still, according to Van Houtte's advertising catalogue, on sale in the Ghent nurseries.

In Surinam, there were seen some plants in full bloom at four feet high from the ground; but the tallest specimen forwarded to Belgium, was nine feet three inches high from the ground to the top of the trunk, or base of the fronds (fig. 1). The largest branching specimen exhibited in the engraving is eight feet six inches high from the ground to the apex of the head divisions (fig. 2); the other branching specimen shown in the drawing is eight feet in height (fig. 3). Mr. Regel is himself of opinion, from what he observed in Surinam, that the Sago Palm has never attained greater dimensions than those just mentioned, either in that or any other country—not even excepting the native habitats of the plant, China and Japan. Moreover, respecting the presumed age of these fine Cycads,—supposing that full forty years must have elapsed previous to the formation of the "annual rings of the stem" at present observable, and reckoning the number of the latter as amounting to about sixty, they have, in that gentleman's estimation, passed through all the wondrous phases of vegetable development for a good round century, or even a longer period.

[* A male plant of the Cycas revoluta, is recorded as having bloomed in the collection of Miss Neilson of York, about 1835 (*Flor. Mag.*). This, which was an aged plant, is stated to have been presented by the Earl of Derby to Mrs. Beaumont of Bretton Hall; it afterwards came into the possession of Miss Neilson; and subsequently passed to the Sheffield Botanic Garden, where it flowered again in 1839. This was stated to have been the first and only male plant that had bloomed in England.]



It is worthy of remark that, in China and Japan, the Sago Palm produces its plume-like crest of leaves but once a year; but, in Surinam, impelled by circumstances relating to its climatology, they frequently make two distinct growths during the same period. That this is mainly, if not solely, attributable to the presence of a greater amount of humidity in certain localities compared with others in that country, will be evident, when it is stated that plants of the Sago Palm, which grow in situations becoming inundated during the "rainy season," were observed to have made two growths; whereas, others growing in more elevated, and consequently, much drier places, accomplished but one seasonal development of their frond-like foliage. Reasoning analogically, does not the knowledge of this fact supply us at once with a feasible explanation of the reason, why Cycadaceæ coming from Surinam, are not as readily, and as rapidly, induced to vegetate, as members of the same family imported from climes less hot and moist?

We have already observed, that the magnificent Cycads which form the subject of these remarks, grew upon the site of what had once been a cemetery, adjacent to the town of Paramaribo. My Surinam informant enters somewhat further into a description of the situation in question. He describes it as "a deserted, sunny spot, near to a marsh," which regularly becomes so much swollen during the primary half of the "rainy season," as to overflow to some distance, the subjacent territory; but partly in consequence of the great heat inducing a rapid evaporation, and partly owing to the porosity and thirstiness of the soil, occasioned by the plentiful presence of sand, the inundation quickly subsides, or rather disappears. Polypodium aureum grew luxuriantly, but gracefully, upon the trunks of the Sago Palms; luxuriant grasses, and Cyperaceæ clothed the spongy ground around them; close at hand were various Malpighias and Melastomaceæ; also several Polygonaceæ, as Coccoloba guayanensis, &c., the *tout ensemble* composing a pretty exotic wilderness of shrubs, and herbaceous plants, festooned with white, rose-coloured, and golden Ipomœas, and a diversity of Convolvulaceæ. Far away in the background, uprose the slender stems of the royal Oreodoxa, whose long fronds contrasted remarkably with the ample fans of Mauritia flexuosa standing isolated here and there. In this direction a primeval forest surrounded the entire scene. "Turning myself," says Mr. Regel, "to the opposite side, before me lay the marsh diversified with Limnocharis Humboldtii, grasses of different kinds and dimensions, and numberless Alisma echinocarpum.• Farther on were herbaceous Melastomads, with rosy flowers, and the beautiful Cassia alata, profusely adorned with glorious flower-spikes of yellow. Beyond was the capital of Surinam, above which were visible the crests of many Palms, and immense trees of the white-flowered, magnolia-like, Mammea americana." What a delightful recollection!

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ABSORPTION AND FIXATION OF MANURE BY EARTHS.

By J. TOWERS, Esq., C.M.H.S.

THESE subjects have recently acquired peculiar interest in consequence of the facts disclosed in the *Journal of the Royal Agricultural Society*, vol. xi. part 1, particularly in the elaborate article of Professor Way, which describes the results of many decisive and luminous experiments. Manures in the fluid state have been greatly extolled; and of late years we have seldom taken up a horticultural periodical without meeting with some observation or other, recommendatory of liquid manures. The practice, however, has been altogether empirical, grounded upon the assumption that fluids are more readily absorbed than solids by the roots of plants. The light of truth will, as it becomes diffused, banish error in theory and practice, and by the following detail of a few very simple experiments, I hope to elucidate the principles of the new theory—of which Mr. Way's essay may be considered the basis—and at the same time enable any intelligent cultivator of garden or field to experiment for himself, and thus to obtain results which must prove undeniably conclusive.

All earths suited to the proper culture of good vegetables in general, come under the denomination of loams, which must be understood to comprise varying proportions of sand, clay, iron, and carbonate of lime (chalk)—sand and clay being the preponderating constituents. Loams absorb manures, and hold them fast, thus (while themselves being converted to soil) they prepare the decomposable matters that they have absorbed, and bring them into the condition of raw sap—a fluid which the plant can alone attract as its essential aliment. Sand, and that fine earth called peat or moor-soil, though suitable to the hair-rooted tribes, do not retain manures, and therefore are designated hungry, being incapable of sustaining the higher vegetable crops. These facts comprise the leading principles of the sublime theory which it is our object to render plain and comprehensible.

The dark fluid which runs too much to waste from dung-hills and compost heaps, is fitted for the purpose of experiment; or, in lieu of it, a good substitute can be easily prepared by infusing a quart measure of horse-droppings that have been collected two or three months (and so far fermented as to be somewhat blackened), in a gallon of boiling, pure rain water. As dung in the state described, has acquired a portion of the peculiar product of decay called *humus*, two fluid drachms (equal to about a dessert spoonful) of strong liquor of *pure ammonia*, are to be added when the heat is much reduced. The whole should then be stirred repeatedly, and thus left to digest for twenty-four hours, when the ammonia will have united with the humus matter, and a deep brown liquid manure will be the result. It should be clearly understood that any kind of such fluid, however prepared, from the excrements of animals or of poultry, whether recently made and sweet, or in a state of decay and fetid, will answer equally well; but the foregoing preparation is recommended to enable the inquiring operator to "begin at the beginning," and thus to make himself acquainted with every individual process. When the mixture has remained undisturbed for some hours after the last stirring, the liquor should be strained through a cloth or flannel drainer, and kept in a bottle, or covered jug for future operations, which will be duly described after I have mentioned the tests or re-agents that are required to ascertain the several chemical changes effected.

1. *Lime-water*, prepared by agitating *cold* water with excess of powdered fresh lime, in a closely stopped vessel, and after the deposition of the lime, pouring off the clear liquid, It is a curious fact that cold water dissolves more lime than hot water does, for a pint of the former is stated to take up eleven grains, whereas at 212 degrees, or the boiling point, "only seven grains are retained in solution." A very small quantity of lime, if thoroughly well burnt, and fresh, will saturate a large measure of water; but it is always prudent to employ it in some excess.
2. *Oxalate of Ammonia*—a most delicate test for lime.
3. *Nitric acid*, an essential article in many chemical processes.
4. *Nitrate of Barytes*, for discovering the presence of sulphuric acid.
5. *Nitrate of Silver*, for the detection of muriatic acid, or its salts.

The four last tests—of which a small quantity only will be required—can be purchased at a trifling expense at any of the philosophical chemists in London, and the chief provincial towns; and also the few test tubes, glasses, &c., that are generally used in chemical experiments.

The application of these re-agents will be minutely described in a future article. I must now limit myself to the proof of that leading fact which is assumed in the heading of the present paper.

Let a small quantity of sound, loamy garden soil be screened through a common wire sieve, so as to separate the stones and fibrous lumps of earth: it is not needful to dry, or to reduce it to powder. With this, fill a Hyacinth pot, or a glass vessel eight or ten inches deep, with a hole or neck at the bottom, over which a piece of linen is tied. Put in the earth so that every part be regularly filled, as in the most careful potting: shake and pat the sides of the vessel, that there may be no air holes or interstices. Place the pot, or cylindrical glass on a convenient stand, and under it a clean pan or basin to receive the liquid drainage, which will be produced. Then pour over the mould small quantities of the liquid manure—say about a wine-glass each time—equally over every part of the surface, waiting till the whole pass into the earth before another is added. If a glass cylinder be used, the gradual passage of the fluid can be observed; and this, it is obvious, must be advantageous. When the mould is wetted throughout, a portion of fluid will trickle through the lower orifice of the vessel; and this, if foul, should be returned over the mould. I have found that in a vessel four inches wide at top, and throughout its length, containing seven full inches depth of soil, about ten ounces (*i. e.* about five wine-glasses) of liquid manure, will completely saturate the earth, and also allow the filtration of about a wine-glass, or two fluid ounces, which will fall into the receiver. This drainage ought to be *clear*, and almost *colourless*, and void of odour. If so, it should be poured into a clean phial; after which, another small quantity of the brown manure should be poured over the mould. When any colour is perceived to pass, the process will be so far completed, as it must then be plain that no further absorption can take place in a mass already saturated.

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HINTS TO PLANTERS AND IMPROVERS.

By Mr. J. COX, Gardener to W. Wells, Esq., Redleaf.

AT this season of the year, when planting and alterations are in full operation, it may not be amiss to offer a few remarks for the consideration of those to whom such work is entrusted; and as I have lately had my attention particularly directed to the subject, I shall not be deterred by the extreme difficulty of advancing anything new on subjects which have occupied the attention of some of the ablest men of the past and present day—from detailing a few impressions which circumstances have forced upon me. I do it with the view of drawing attention to the subject, in order to incite to a spirit of observation, not as presuming to *teach* when I myself have much to learn.

There cannot be a doubt but that certain combinations of trees, for example, are more pleasing than others; and that, therefore, in addition to studying their size, forms, and characteristics, one must also study their effect in combination or otherwise, in order that they may be so disposed as to give evidence of design on the part of the planter. Extensive and varied observations are therefore indispensable to perfection on this point; for it is certain, that in this, as in many other things, there is a standard to be aimed at, and, though occasionally pleasing combinations are produced by chance, yet chance is not to be depended upon. It must, therefore, be a desirable thing to have some certain recognisable rules whereby to regulate the planting, in the first instance; and these, of course, must vary with the facilities afforded by the different localities to be operated upon.

If we see a valley thickly planted with trees, and the summits of the adjacent hills left bare, we could hardly fail to be disagreeably impressed with the bad taste of the projector, or to consider it a case where the natural advantages were (if I may so term it) planted out; but if, on the contrary, the hills were crowned with woods, and the valley converted into a pasture, with here and there a group to break the too great uniformity—some bold projections and deep indentations being formed in the main body of the woods, carried in some instances nearly to the summits of the eminences—it could hardly fail to convey a pleasing impression to a mind possessed of taste to appreciate, and comprehension to understand; for in this manner the apparent height of the hills would be much increased, and by the same rule so also would the depth of the valley. Thus would be produced, by skilful management, two grand requisites for effect, viz., height and depth, consequently broader light and shade. Hence, there is, in this instance, evidently a right and wrong method of proceeding. Doubtless many other instances might be quoted, but I have advanced enough to excite the attention of those who aspire to be more than mere "hewers of wood and drawers of water." Such persons—prepared by the enlightened science and literature which at the present day is so liberally diffused, that all who desire may attain to it—need only to enter on the study with earnestness, and many a hidden Repton, or Kent, or Brown, may be brought to light.

I will now venture to offer a few remarks bearing more directly on the practical part of the subject. Distant views or objects appear to far greater advantage when looked at from beneath and amongst the wide spreading arms and gigantic trunks of large trees, than when viewed from an open space. The planter, therefore, in the formation of a new place, should bear this idea in mind; and, at various points where desirable views present themselves, should plant groups of such trees as are calculated to produce those wide-spreading arms and large trunks; the Cedar of Lebanon, the Deodar, and Oak, are very applicable. The improver should also bear the same idea in mind, for he will often find ready to his hand, a group of trees which only require to be laid open to form at once a *status* from which many other operations may proceed, and ideas flow. Sometimes, also, he may think that a tree stands in his way. In such cases, before he cuts it down, let him see if the removal of a few of the lower branches, and thinning out others, may not answer every purpose, besides adding to the picturesque effect. Very often the removal of a large tree, or a group, greatly diminishes the amount of light and shade, (in combination, observe); and as this is a most important consideration, the greatest circumspection should be used in determining what should be entirely removed, or what partially so.

Although trees with large trunks and mighty outstretched arms are amongst the grandest ornaments in nature, and whether viewed from a distance, or whilst reposing beneath their umbrageous shade, are calculated to strike with awe and admiration, yet we cannot help admiring also those which feather gracefully down, and repose on the green turf; these, when in their proper situation, that is, where they offer no impediment to the view beyond, and are themselves *the* object of attraction, —are very beautiful, and therefore proper sites should be selected for groups of trees adapted for the purpose. This leads me to another consideration, viz., whether the art of planting the same kind of trees in individual groups, has had that attention paid to it which it deserves; for, however beautiful single specimens may appear, there are few cases in which three or more of the same species are not infinitely preferable, and capable of producing a far more pleasing effect, because by this combination we may very often see exemplified the different characteristics which the same species present; and by contrast, in juxta position, these are brought more prominently under notice, at the same time that the unity of the group is preserved. Again, groups rather thinly distributed than otherwise, have a far finer park-like effect, than the dotted appearance which the same number of trees planted singly would produce.

Another consideration is the due admixture of spiral with round-headed trees. As a general rule, the latter must and ought greatly to predominate, because a rounded outline is more agreeable to the eye, but here and there a group of spiral trees, such as the Abies Douglasii, the Silver Fir, and the common but beautiful spiral Poplar, will contribute very much to create effect by contrast; and at the same time arrest the attention, and relieve the eye, which grows restless when contemplating monotony under whatever shape it may be presented to it.

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Miscellaneous Notice.

Timber of Pinus longifolia.—A curious phenomenon, yet unaccounted for, is observable in perhaps one-half the whole number of Pinus longifolia in Kumaon. This consists in the spiral arrangement of the bark and woody fibre, the coils being sometimes as much compressed as those of an ordinary corkscrew, and, in some instances, the stem itself is thus contorted. This is attributed by the people to the action of the wind, but the phenomenon is apparently unknown in Gurwhal, &c., where the winds are equally violent; while at Kumaon we find specimens with straight and with spiral fibres mixed up in the same forest, and trees of other genera, in company with these are never so affected, nor does the peculiarity extend to the Coniferæ of the upper ranges. A careful dissection, under the microscope, would perhaps show it to be already present in the embryo. There is a strong prejudice against the use of the twisted timber, which may be well founded, where it is required for planks; but when applied, unsquared, for roof-trees, it appears to stand well, bearing great weights for many years; nor in Kumaon does the practice or the experience of the people at all bear out the very inferior estimate of the timber formed by some of our officers in Gurwhal. From the facility of obtaining it, little other wood is used in great part of the province, where, with ordinary care, it is calculated to last a couple of generations.—*Major Madden, in Journ. Agric. and Hort. Soc. of India.*

FRANCISCEA EXIMIA.

Nat. Order, Scrophulariaceæ, *Bentham*, Atropaceæ, *Miers*.

Generic Character.—Franciscea, *Pohl.* (char. emend.). *Calyx* inflated-tubular, mouth oblique, five-toothed. *Corolla* salver-shaped, tube narrow, a little inflated at the back at the summit; throat constricted into a very prominent oblique mouth; limb oblique, rotate, expanded, five-toothed beyond the middle; lobes unequal, rounded, entire, the uppermost largest; æstivation quincuncially imbricated, the sinuses introflexed. *Stamens* four, didynamous, included, short, inserted in equal pairs beneath the dilatation of the tube, the two longer beneath the large upper lobe; *filaments* rather fleshy, compressed, corrugated, inflexed at the apex; *anthers* reniform, compressed, affixed by the sinus, one-celled, opening with two valves by a marginal slit, the globose polliniferous receptacle conspicuous in the sinus. *Ovary* obovate, surrounded at the bottom by a stalked fleshy glandule, two-celled; placentas fleshy, prominent, adnate to the dissepiment on both sides, many-ovuled; *style* filiform, very much thickened at the apex and inflexed; *stigma* two-lipped, lobes short, rather thick, obtuse, glandular within. *Capsule* ovate, included in the persistent calyx, coriaceous, two-valved, two-celled; valves parallel to the ultimately free placenta. *Seeds* few, rather large, oblong, subangular, convex on the back, hilum ventral, conspicuous concave, testa reticulately-pitted. *Embryo* contrary to the hilum, incurved in the axis of fleshy albumen; cotyledons ovate compressed one-third the length and twice as broad as the terete radicle, which is slender below.—Brazilian and Peruvian under-shrubs; leaves alternate, quite entire, oblong. Cymes terminal, densely capitulous or loosely few-flowered, rarely reduced to a single flower; bracts small; flowers showy, violaceous, sometimes paler, tube of the corolla about equal to the calyx, more rarely twice or four times as long. —*Miers, in Ann. of Nat. Hist. Ser. II*, v. 249.)

Franciscea eximia, *Scheidweiler*.—Choice Franciscea.—Leaves oblong, or lanceolate acuminate, opaque, paler beneath; branches erect, and, as well as the calyx, downy; tube of the *corolla curved, slightly exserted; cymes loose, two-, three-, or* four-flowered; calyx an inch long, tubular, sub-inflated; peduncles half an inch long; corolla intensely blue-purple.

Synonymy.—Franciscea eximia, *Scheidweiler MS. Gard. Mag. Bot.*, i. 16.

Description.—A somewhat erect-growing shrub, attaining three to four or five feet in height, and apparently having the habit of Franciscea latifolia. The leaves are oblong, or lanceolate, tapering to a sharp point, from three to six inches long, and an inch and a half broad, of a dull green colour. At the ends of the shoots and lateral branches grow the few-flowered cymes, which are furnished with ovate-acuminate bracts at the base of the peduncles. Cymes two- to four-flowered, the flowers large and showy, three inches in diameter, of a deep violet colour, becoming paler after expansion, as in the other cultivated species. Calyx with five sharp-pointed nearly equal teeth. Corolla tube somewhat exceeding the calyx, slender, curved near the apex; limb of five spreading rounded undulated lobes, somewhat deeper coloured towards the base.

History, &c.—The fine species of Franciscea, which forms the subject of the annexed plate, is a native of Brazil; where it was found, in the environs of Villa Franca, in the province of St. Paul, growing in the shady parts of the untrod forests. It was discovered by M. Libon, the collector of M. de Jonghe, of Brussels, and was received by M. de Jonghe in 1847. We understand it has already found its way into several English gardens.

In Belgium this Franciscea eximia is spoken of as the finest species of the genus yet in cultivation; and we learn, also, that it proves to be a free flowerer—plants of the height of two feet and a half producing successively through the blooming season upwards of two hundred blossoms, of the size and colour represented in our plate. The first blossoms borne in Europe were produced in March, 1849, and the original plant again commenced flowering in January, 1850, and continued to produce blossoms till the end of June. Young plants are also reported to flower freely.

Culture.—The Franciseeas require to be grown in the stove. When at rest, however, which, in the different species, occurs at varying periods, the temperature of an intermediate house is high enough for them; and from this state of rest they are excited by a gentle increase of temperature, aided by the use of mild bottom heat. They are increased by cuttings of the young shoots planted in sand under bell-glasses, and plunged in a gentle heat. When they produce seeds, this affords another means of increase; F. latifolia not unfrequently bears seeds. They should be potted in a compost of fibry peat, good mellow loam, and leaf-mould, in about equal parts, enough sand being added to secure the free passage of water. Of this element they must have but little while in a dormant state, but when growth has become active they will be benefited by a liberal supply, if care is taken that it does not stagnate. The large-leaved species seem to require the most liberal supplies of water. Several of the species rank amongst the most useful of winter-blooming plants.—M.

Vegetable Physiology,

BY ARTHUR HENFREY, ESQ., F.L.S., LECTURER ON BOTANY AT ST. GEORGE'S HOSPITAL.

THE ELEMENTARY STRUCTURE OF PLANTS—(*Continued*).

THE last chapter (page 124) concluded with a description of the general character of the construction of the stem of Monocotyledons, and it was then pointed out that the woody skeleton, composed of the fibro-vascular bundles, consists of a large number of these lying loosely embedded, free from one another, in the soft, spongy, cellular tissue of the stem; it was shown that these bundles do not undergo any important alteration after they are completely developed, and that the principal changes which take place in Monocotyledonous trunks, such as those of Palms, arise from the consolidation of the general cellular tissue, by its acquiring a woody consistence, through the deposit of thickening layers in its cells, so that the fibro-vascular bundles are at last bound together, and become part of a solid woody mass. But this does not alter the relative position and arrangement of the various parts.

It is very different with the stems of Dicotyledons. We find here that not only is the structure of the bundles peculiar, but that there is a new and more definite mode of arrangement; moreover, that the history of their growth includes a series of additional developments, in which altogether new parts are produced, and which only terminate with the life of the plant. The characters of the Dicotyledonous stem should be studied, in the first place, in annual plants, and in the yearling shoots of perennials, the conditions being essentially the same.

When we cut one of these across, we find a more distinctly marked division into *regions* than exists in the Monocotyledonous stem; the fibro-vascular bundles do not here lie scattered through the cellular mass, but present a regular circle at their cut ends, surrounding and cutting off a central spongy region, which we recognise as the ***pith***, from a second external cellular region, belonging to the bark or rind structures. If the stem or shoot be very young the ends of the bundles will much resemble those of the Monocotyledons, and will form a circular row, divided from one another by lines of the cellular structure, reaching out from the pith to the bark; when a little older they will be found to have acquired a somewhat triangular shape with their increased size, resembling so many wedges with the narrow ends towards the pith, and now by their enlargement they press upon the lines of cellular stucture intervening between their sides, so as to reduce these to mere plates, which constitute what are called the "medullary rays." The rind, enveloping the wood, has also acquired further development, presenting a division into several regions, each having its peculiar character. To make these and their relations to the inner portions clear, we will trace the nature of the various parts met with as we examine them, from the pith outwards to the surface, in a stem or shoot at the close of its first year's growth.

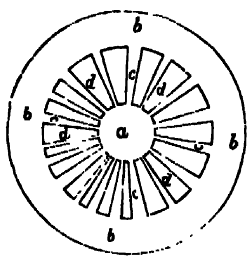
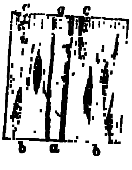


DIAGRAM ILLUSTRATING THE FORMATION OF A DICOTYLEDONOUS STEM.

a, pith; *b*, rind; *c*, *c*, *c*, plates of cellular tissue connecting them, *medullary rays*; *d*, *d*, *d*, fibro-vascular, or woody bundles arranged in a circle.

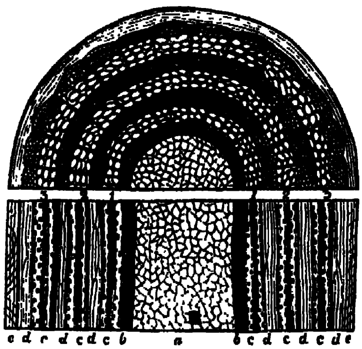
The pith is composed of the nearly unaltered cellular tissue of which the whole stem at first consisted; this is surrounded by a layer of firm woody matter, formed of a circle of fibro-vascular bundles, arranged side by side, and closely in contact, like the staves of a cask, only parted from one another by slit-like openings here and there, filled up with cellular tissue, which are the remains of the tissue lying between them while they were small and delicate; and, as I have already said, are called the medullary rays. The fibro-vascular bundles, when examined microscopically, are found to be composed of the following structures:—Next the pith lies a layer of the so-called spiral vessels, the delicate elastic strengthening organs, which being the first formed, lie here, immediately on the pith, of which they were at first the only protecting structures; they were formerly supposed to have some peculiar function connected with the pith, and hence the circular sheath around the pith they collectively form was called the "medullary sheath;" the medullary sheath, however, is merely the first-formed portion of the woody skeleton, developed in the growing end of the stem, while it is young and delicate, and, therefore, composed of spiral vessels, for the same reason that the ribs of the leaves and leaf-stalks are—namely, to give strength combined with great flexibility.



PERPENDICULAR SECTION OF A PORTION OF A DICOTYLEDONOUS STEM, IN A DIRECTION CROSSING THAT OF THE MEDULLARY RAYS.

a, *a*, porous ducts; *b*, *b*, wood-cells or fibres; *c*, *c*, cut ends of the medullary rays.

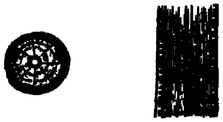
To the elastic spiral structures succeed annular and reticulated tubes, more solid forms of the same structures; then comes a considerable mass of wood, properly so called, the component parts of which differ very much in different plants. Commonly the greater portion consists of the spindle-shaped wood-cells, which become more and more solid by internal deposits as they grow older; while, scattered here and there among the wood-cells, occur large ducts or porous tubes, the open ends of which are often visible to the naked eye in wood cut across the grain. In some plants the wood is wholly composed of these porous ducts or tubes; in others the wood-cells are large, and marked with pores, like the ducts. In some the wood-cells are very small, and closely packed, giving great density; and again, in others, loose cellular regions occur, scattered through the wood, giving to the stem a light and spongy consistence. Into the minutiæ of these points it is not worth while to enter here, although they offer a most interesting field of observation to the microscopist.



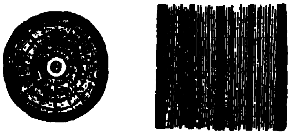
CROSS AND PERPENDICULAR SECTIONS OF THE STEM OF A DICOTYLEDON, THREE YEARS OLD.

In the centre is seen the pith, *a*, composed of cellular tissue; surrounding it is the so-called medullary sheath, *b*; and exterior to this are three rings of wood, each consisting of porous ducts, *c*, *c*, and wood-cells or fibres, *d*, *d*. The outermost is partly in the delicate state called cambium, and joins the bark, the various layers of which are indistinct.

Toward the outer part of the wood we find the tissue of the fibro-vascular bundles become gradually more and more delicate, so that at last its cells are quite soft, and offer but very little resistance to external violence; it is at this point that the rind peels off in stripping young twigs, or barking wood, and when the cells of this region are gorged with sap in spring, they present so little density of texture, that this region was supposed formerly to be a free space in which the thick sap or cambium flowed to form the new wood. It has been clearly shown, however, that the tissue extends uninterruptedly into the bark, and this delicate region is merely to be distinguished by the name of the cambium *layer;* its importance will be shown presently. As the wood becomes gradually more delicate towards the cambium layer, so this latter again, but more suddenly, changes outwards, and we arrive next at a new woody structure; this consists of the *liber bundles*, which are long bundles or strips of a firm stringy texture, lying opposite to and outside the fibro-vascular bundles of the wood, and forming the fibrous region of the bark. These bundles are composed of cells resembling those of the wood, except that they are exceedingly long and slender; and, as they are not collected into such masses as the cells of the internal regions of the stem, they form tough and stringy textures instead of solid wood. They are well seen on the surface of the stem of the Vine or Clematis, when the outer layers of the bark decay so as to expose its liber in stringy shreds. The liber bundles are surrounded and imbedded in a layer of cellular tissue, into which the ends of the medullary rays pass out between them; the cells of this layer are usually filled with green matter, and this region of the bark is the seat of an active vegetation, performing in young stems, and probably to some extent in old ones, similar functions to those of the leaves. The outside of the stem is formed at first of a layer of green *epidermis*, the "skin" of the plant, which will be spoken of hereafter; as it grows older, and in most plants by the end of the first year, it has acquired a brown colour, from the development of the *corky layer*, a layer of cells having thin but strong walls, and constituting a light, but fine and tough tissue, destined to protect the more delicate and more actively occupied structures beneath. Such is the structure of a Dicotyledonous stem at the close of the first year of its growth; but its development does not cease here. The stem thus formed is capable of increasing, by a regular and gradual mode of growth, to an almost unlimited extent, at all events to an extent which is limited by external agencies alone, since the fibro-vascular region is endowed with a perennial vitality, which causes it to produce new layers year after year so long as the other organs of the plant furnish it with nutriment.

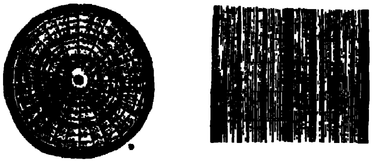


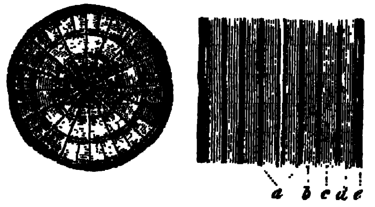
A DICOTYLEDONOUS STEM, ONE YEAR OLD.



A DICOTYLEDONOUS STEM, TWO YEARS OLD.

In the second spring, the cells of the cambium layer begin to multiply once more; they divide, subdivide, and expand, pushing the bark outwards, and thus form a new layer of wood all over the surface of that formed in the preceding year, and as there is a little difference in the size or amount of internal deposit in the last cells of one year and the first of the next, we find a line of demarcation between each period of growth, these being the lines commonly known by the name of "annual rings." At the same time the liber bundles of the bark, which have been pushed outwards to make room for the new wood, receive a new layer on their *inside*; a layer which is very thin, often forming a mere plate, thinner than paper, but as regular in its production as that of the wood; sometimes these may be very distinctly traced, by their coming apart very readily when dry, as in the lace-bark trees, or in the Lime, the liber of which forms the material called *bass*, used for matting, &c.

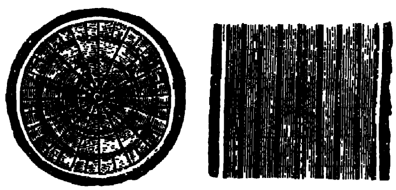

A DICOTYLEDONOUS STEM, THREE YEARS OLD.

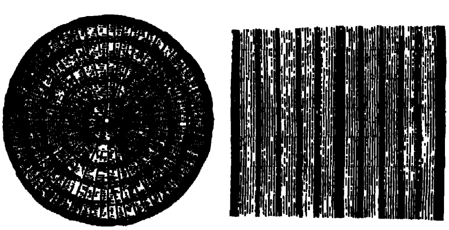


A DICOTYLEDONOUS STEM FOUR YEARS OLD.
a, pith and wood of the first year; *b*, *c*, and *d*, layers of wood of the second, third, and fourth years; *e*, the four thin layers of liber.

Each succeeding year witnesses a similar change, and thus the stem here acquires, simultaneously with the new lengths at its growing points, a new layer of thickening all over the older parts, a process which does not occur in Monocotyledons, or, in a few where it appears to do so, in a totally different way. We have said in each succeeding year, and used the term "annual rings," because in our temperate climate these words represent the truth in almost every instance; the alternations of the seasons are so regular that the periods of growth are annual. But it is not always so in other climates, perhaps not so often as has been imagined; at all events, it is known that the trunks of arborescent Cactaceæ present rings indicating periods of growth extending over several years; and it is the same in the Cycadaceæ. On the other hand, it has been stated that a temporary interruption of growth, such as that produced by the loss of the greater part of the foliage early in the year, will cause two rings for that year; and rings have been counted in such numbers in tropical trees, that we hesitate to regard them as representing periods of existence so long as a year, and incline to believe that less marked changes than our alternations of winter and summer, may suffice in those regions to produce the alternate arrest and re-awaking of development.

The roots of Dicotyledons are naturally, that is in plants raised from seeds and not from cuttings, direct continuations of the lower end of the stem. Their solid structure, therefore, is formed of prolongations downwards of the fibro-vascular bundles, but these soon coalesce, and the pith is lost; there are no medullary rays, and the bark is a rind devoid of liber bundles and more soft and succulent than that of the stem. The wood of the root is increased by successive layers all over the old parts, simultaneously with the formation of the new layers in the stem; but the structures are much less easy to make out here, from their solid condition and the complication arising from the tortuosities and close ramifications of the roots. The main channel of absorption is through the spongy rind of the root and its younger layers of wood, up which the sap rises into the bark, cambium layer, and young wood of the stem. The old wood of the root, like that of the stem, becomes, after a time, consolidated by internal deposits into a dense structure; in some trees almost into a solid mass. This older solid part of the trunk is called the *duramen*, or heart-wood; the outer and still active layers, the *alburnum*, or sap-wood; these regions often presenting even a difference of colour.


SECTION IN THE SPRING OF THE FIFTH YEAR.
The white space indicates the swelling cambium layer.


STEM AT THE END OF THE FIFTH YEAR.
The layers of liber are too thin to be represented in the drawing.

PROFESSIONAL AND MORAL TRAINING.

SUGGESTIVE HINTS ADDRESSED TO YOUNG GARDENERS.

By Mr. W. P. KEANE, Author of the "Beauties of Surrey."

IT is wonderful to contemplate the different changes that matter undergoes—changes that are in active operation at all times. It goes through various modifications, resolving itself into different elements, but on the whole producing no increase or diminution in the matter that was first formed. To begin with ourselves: wonderful as it may seem, our bodies, when we die, will ultimately be nothing more than carbonic acid and ammonia. These we know are the food of plants. Our bones are composed of phosphate of lime, and magnesia, and chalk (the carbonate of lime); carbonate of ammonia is volatile, and is carried into the air, to be wafted on the winds of heaven; the bones are soluble, and the phosphates and carbonate of lime dissolved, and in a state of solution, are taken up by the roots of plants. The dust from the graveyards is transported to a distance, by the winds; the gases ascending from the same places, commingling with the atmosphere, are absorbed and assimilated by the leaves of plants, and these plants may be grain, fruits, or vegetables, fit food for the sustenance of man. Thus, there is one continued interchange, to preserve the uniform supply of matter to all created beings. The world is composed of animals, vegetables, and minerals. The atmosphere is composed of several gases, namely, oxygen, hydrogen, nitrogen, and carbonic acid. Oxygen inspired by animals is the cause of animal heat; it is the supporter of combustion, and all the changes in the elements of our earth are affected more or less by its action. Hydrogen is an element united with oxygen in the formation of water. Nitrogen produced by the decomposition of animal and vegetable substances, is the most nutricious ingredient for all gardening purposes. The ammonia so useful to vegetation consists of six parts of hydrogen and two parts of nitrogen; urine and stable manure are very rich in ammonia; that portion that ascends into the atmosphere is brought down with every shower of rain to fertilize the land. Carbon is given out by the respiration of animals; it exists in all natural manures, and plants are also supplied with it from the atmosphere.

How beautiful is the harmony of Nature. Animal life depends for support upon vegetable life, and vegetable life is indebted to the assistance of minerals for its support. They are all links in the great chain of universal existence. To make it more plain, man's existence is continued by the nourishment he receives from the flesh of animals, and from vegetables; animals feed upon vegetables; and vegetables upon organic and inorganic substances, in a state of solution. Man and the other animals after death undergo changes by the action of the atmospheric agents, by which they become the food for plants; and plants in a similar manner after death contribute to the support of their descendants. Matter undergoes various changes, its elements are re-arranged to continue the same matter—even the very same weight of substance now as was in the world at the moment of its creation.

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New and Rare Plants.

Medinilla Sieboldiana, *Planchon*. Siebold's Medinilla (*Flore des Serres*, t. 482). -Nat. Ord., Melastomaceæ § Melastomeæ.- Syn., M. eximia, *Siebold*, not of *Blume* —A handsome stove shrub, quite smooth, the branches terete, except when very young, when they are obsoletely four-angled. The leaves are opposite, somewhat fleshy, entire, triple-nerved, oblong-elliptic, deep green above tinted with pale brown beneath, and attached by short footstalks. The flowers are numerous, in short naked divaricating panicles, which grow from the old wood; they are of a waxy texture, the petals four, white tinted with rose at the base, the subglobose calyx being yellowish brown, and the stamens deep rose colour. From Java. Introduced to Belgium, about 1847, by M. Van Houtte. Flowers?

Opuntia Salmiana, *Parmentier*. Prince de Salm's Opuntia (*Bot. Mag.*, t. 4542).—Nat. Ord., Cactaceæ § Opuntidæ. —A very pretty, slender, succulent plant, requiring an intermediate stove. It grows one to two feet high, of branched habit, with erect cylindrical slender branches of an ashy green colour, bearing scattered areoles formed of white downy tufts of wool, among which are six to eight small brown unequal spines. The flowers are copiously clustered about the ends of the branches, moderate-sized, the sepals gradually passing into petals; the outside is red, but, when fully expanded, the ground colour of the flowers is sulphur-yellow, slightly tinted with rose colour and red down the centre; the petals are obovate; the flowers about two inches in diameter. From Brazil. Introduced about 1848. Flowers in September and October. Royal Botanic Garden, Kew.

Cyanotis vittata, *Lindley*. Banded-leaved Cyanotis (*Journ. Hort. Soc.*, v., 139). —Nat. Ord., Commelynaceæ. —Syn., Tradescantia zebrina, *of gardens*.—A herbaceous stove plant of small size, with ornamental foliage. The stems are procumbent, much branched, spreading on the ground, or hanging over the edges of the pots or baskets in which it is grown; they are more or less tinged with purple. The leaves are oblong-oval, oblique at the base, purple beneath, dark purplish green above, with two longitudinal silvery bands, and hairy sheathing petioles. The flowers are small, inconspicuous, purple, appearing for a long time one after another, from within a couple of terminal bracts, of which one resembles the ordinary leaves except in being stalkless, the other is shorter and boat-shaped. It is a pretty plant for planting on bare surfaces of soil in hothouses, or for hanging over baskets or pots in which other plants are suspended. Native country unknown. Introduced before 1848. Flowers in spring and summer, or throughout the year.

ANGRÆCUM VIRENS, *Lindley*. Greenish-flowered Angræcum (*Paxt. Fl. Gard.*, i., 25).—Nat. Ord., Orchidaceæ § Vandeæ-Sarcanthideæ.—A noble-looking stove epiphyte with an erect rooting stem, and flaccid glaucous distichous leaves of a broad strap-shaped form. The flowers grow on erect spikes about two feet long; the sepals and petals are narrow, lance-shaped, greenish; the lip is subrotund, with the apex convolute and cuspidate, white, conspicuously tinged with green. From the Isle of Bourbon. Introduced in 1847. Flowers in winter or spring.

ANIGOZANTHOS TYRIANTHINA, *Hooker*. Tyrian-purple Anigozanthos (*Bot. Mag*, t. 4507).—Nat. Ord., Hæmodoraceæ.—A handsome greenhouse perennial, with a short thick woody caudex, and a leafy stem, three to five feet high, simple, and hoary with downy tomentum. The root leaves are a foot long, linear, striated, equitant, pale green, the edges scabrous. The flowers grow in close one-sided spikes, upon the terminal branches of the paniculated stem; they consist of a long curved tube, swollen at the base, and divided into half-a-dozen pointed segments, and as well as the stalks are clothed with a dense wool of the richest Tyrian purple; they are glabrous and straw-coloured on the inner surface. From Australia: south-west of the Swan River settlement. Not yet introduced. Flowers?

PHILODENDRON PERTUSUM, *Kunth* and *Bouche*. Bored-leaved Philodendron (*Ann. de Gand.*, v., 252).—Nat. Ord., Araceæ § Caladieæ.—A fine-looking stove herbaceous perennial, having a climbing rhizome, furnished with cordate sub-rotundate ovate pinnatifid coriaceous leaves, three to four feet long, and remarkable from being pierced with small holes; the divisions of these leaves are broadly linear, obliquely acuminate, and hooked. The spadix is unknown. From Guatemala. Introduced to Berlin, by M. Warzcewitz in 1849. Flowers?

ANTHURIUM AMŒNUM, *Kunth* and *Bouche*. Pleasing Anthurium (*Ann. de Gand.*, v. 185).—Nat. Ord., Orontiaceæ § Orontieæ.—A stove perennial, with short straight rooting stems, furnished with oblong acuminate leaves, rounded at the base, nine inches long, and penninerved; the petioles are about six inches long. The scape is three to four inches long, bearing the ovate-oblong sharply-pointed subcordate spathe, which is green, with purple at the apex, where it is revolute; the spadix is about as thick as a quill. From Caraccas. Introduced to Berlin by M. Moritz about 1847. Flowers in September.

OBERONIA IRIDIFOLIA, *Lindley*. Iris-leaved Oberonia (*Bot. Mag.*, t. 4517).—Nat. Ord., Orchidaceæ § Malaxeæ-Liparidæ.—Syn., Cymbidium iridifolium, *Roxburgh*; Malaxis ensiformis, *Smith*.—A small unattractive stove epiphyte, with a few broad ensiform leaves, and a spike of innumerable dense small flowers of a pale yellowish flesh-colour; the flower spike, except in colour, looks like a stumpy rat's tail. From India, Ceylon, and Otaheite. Introduced about 1848. Flowers in winter. Royal Botanic Garden, Kew.

METROSIDEROS BUXIFOLIA, *Allan Cunningham*. Box-leaved Metrosideros (*Bot. Mag* t. 4515).—Nat. Ord., Myrtaceæ § Leptospermeæ.—*Aki* of the New Zealanders.—A neat box-like branching shrub, "in its native country scandent and rooting like Ivy." The leaves are disposed in four rows, numerous, small, almost sessile, elliptic or ovate-rotundate, dark green and glossy on the upper surface, somewhat paler and hoary beneath, the texture leathery; except in being blunter, they have much the appearance of those of a small leaved myrtle. The flowers grow from the axils of the terminal leaves, assuming the appearance of small leafy heads; they are small and whitish. From New Zealand: forests of Wangaroa. Introduced before 1848. Flowers in August. Royal Botanic Garden, Kew.

HAKEA VICTORIÆ, *Drummond*. Royal Hakea (*Lond. Journ. Botany*).—Nat. Ord., Proteaceæ § Folliculares.—A remarkably splendid evergreen greenhouse shrub, in its native country growing from twelve to fourteen feet in height, with white velvety stems and buds. The leaves, which are jagged and sinuated, are from six to eight inches long. The most conspicuous parts are the richly variegated bracts, which, on plants three or four years old, are borne in regular whorls, each whorl from seven to nine inches in height, formed of five rows, each containing five bracts; the lowest bracts are the broadest, and measure from four to five inches, the whole breadth being about ten inches; they decrease in size upwards, the uppermost being only four inches across in their whole breadth. Each whorl is a year's growth after the plant begins to flower; the first year they are yellowish-white in the centre, the veins, and the teeth; the second year what was white becomes golden yellow; the third year what was yellow becomes rich orange; and the fourth year blood-red; the green, light and luminous the first year, varies annually to deeper shades. Flowers not described. From Australia: near Mount Barren. Introduced about 1847. Flowers? Royal Botanic Garden, Kew.

ACROPERA ARMENIACA, *Lindley*. Apricot-coloured Acropera (*Paxt. Fl. Gard.*, i. 94).—Nat. Ord., Orchidaceæ § Vandeæ-Maxillaridæ.—A curious and pretty stove epiphyte. The pseudo-bulbs and leaves are not described. The flowers grow in pendent, loose, many-flowered racemes, and are rather large, and coloured like the sunny side of a ripe Apricot; the sepals are apiculate, the lateral ones oblique with the apex rounded; the petals are free, half as long as the column; the point of the lip free, undivided, and flat. From Nicaragua. Introduced, by M. Warcewitz, in 1849. Flowers in summer. Sir P. M. Egerton, Bart.

CAMPANULA NOBILIS, ALBA, *Van Houtte*. White noble Bellflower (*Flore des Serres*, t. 563).—Nat. Ord., Campanulaceæ § Campanuleæ.—A fine hardy herbaceous plant, raised from the Campanula nobilis, introduced to Europe by Mr. Fortune, fertilized by C. punctata. It has the habit and appearance of the original Chinese plant, but has advantageously exchanged the dingy purple of the blossoms of that kind, for a tolerably pure white, which is dotted over with small violet specks. A Belgian garden variety, raised by M. Van Houtte. Introduced in 1850. Flowers in the summer months.

Cattleya labiata, picta, *Lindley*. Blotched ruby-lipped Cattleya (*Paxt. Fl. Gard.*, i., t. 24):

Cattleya labiata, alba, *Lindley*. White ruby-lipped Cattleya (*Paxt. Fl. Gard.*, i., t. 24).—Nat. Ord., Orchidaceæ § Epidendreæ-Læliadæ. The above are two fine and distinct varieties of the well known C. labiata, from which, according to Dr. Lindley, C. Mossiæ does not differ specifically; indeed, there are numerous imported varieties of this, as of some other orchids. The stems of these plants are between club-shaped and spindle-shaped; the leaves oblong, solitary; the spathe as long as the peduncle; the sepals linear-lanceolate, acute; the petals much broader, wavy; the lip obovate, crisped, wavy, and emarginate. The var. *picta* has very large rosy lilac flowers, which are blotched with brighter rose; the lip deep rich crimson. blotched towards the edge; grown by J. J. Blandy, Esq. The var. *alba* is white, except the lip, which is crimson, broken and blotched towards the margin, where it is white; grown at Syon. From Brazil. Introduced about 1848. Flowers in summer.

Gordonia javanica, *Rollisson*. Javanese Gordonia (*Bot. Mag.*, t. 4539).—Nat. Ord., Ternströmiaceæ.—A branched, evergreen, stove shrub, with the aspect of a tea plant. The branches are terete, the leaves alternate, elliptic-lanceolate, leathery, and quite entire. The flowers grow singly on solitary peduncles, axillary from the base of most of the upper leaves, which peduncles bear two or three deciduous, spathulate, green bracts below the calyx; the flowers consist of five obovate, white petals, and are scarcely two inches in diameter. From Java: probably in the mountains. Introduced in 1848. Flowers in August and September. Messrs. Rollisson of Tooting.

Portlandia platantha, *Hooker*. Broad-flowered Portlandia (*Bot. Mag.*, t. 4534). - Nat. Ord., Cinchonaceæ § Cinchoneæ.—A fine showy stove, evergreen, glabrous shrub, of erect branching habit. The leaves are large, opposite with very short stalks, elliptic-obovate, somewhat leathery, and of a full glossy green. The flowers grow singly on short stalks from the axils of the leaves, often opposite; the calyx has four spreading, leafy, lanceolate lobes; the corolla is white, broadly and shortly funnel-shaped, approaching to bell-shaped; five-ribbed, with a limb of five spreading, ovate lobes, with revolute margins. It has been grown as a fine variety of P. grandiflora, but is distinct from that species; the flowers not being half the length, and much more freely produced. From the West Indies? Introduced before 1850. Flowers all summer, "almost always in blossom." Messrs. Lucombe, Pince, and Co., of Exeter.

Rhododendron cinnamomeum, Cunninghami, *Lindley*. Cunningham's White Rhododendron (*Paxt. Fl. Gard.*, i., t. 16). --Nat, Ord., Ericaceæ § Rhododendreæ.- A splendid hardy evergreen shrub, raised from R. cinnamomeum crossed with R. maximum. The flower heads are large, and the flowers pure white, boutifully contrasting with the dark purple spotting on the upper segment of the corolla. It is stated to be quite hardy. A garden hybrid, raised, about 1848, by Mr. Cunningham, of Liverpool. Flowers in May.

Rhododendron ponticum, Vervaeneanum flore-pleno, *Van Houtte*. Vervaene's double Rhododendron (*Flore des Serres*, t. 492).—Nat. Ord., Ericaceæ § Rhododendreæ.- -A fine hardy shrub, remarkable among the Rhododendrons for its semi-double blossoms, which are produced in large depressed dense pyramidal heads or corymbs; the colour is a pale lilac-purple, the upper segment of the corolla marked with scattered yellow spots. A Belgian garden variety of some merit.

Dianthus cruentus, *Fischer*. Blood-red Dianthus (*Flore des Serres*, t. 488). Nat. Ord., Caryophyllaceæ § Sileneæ. A very pretty hardy perennial, very smooth except on the petals. The leaves are produced in crowded tufts, and are connate at the base, lanceolate-linear, drawn out to a long sharp point. The flowering stems are simple, from one to two feet high, terminated by a nearly globular contracted cyme, consisting of a crowded mass of bracts and flowers; the bracts scarious, rusty, and long pointed; the flowers about an inch across, consisting of five distinct, rhomboid, wedge-shaped, toothed petals, of a vivid carmine, having a few violet hairs at the base; the projecting stamens are of a greyish lead-colour. Supposed to come from Siberia, or the Caucasus. Introduced to Belgium, in 1849, from St. Petersburgh. Flowers in summer. M. Van Houtte, of Ghent.

Oncidium sessile, *Lindley*. Sessile Oncid (*Paxt. Fl. Gard.*, i., t. 21). --Nat. Ord., Orchidaceæ § Vandeæ-Brassidæ.—A pretty stove epiphyte, with oblong, compressed, pseudo-bulbs, which bear two strap-shaped, blunt, papery leaves, shorter than the scape, which bears a panicled raceme of flowers. These are yellow, very faintly spotted about the centre with pale cinnamon colour; the sepals and petals are conformable, oblong obtuse, all sessile, that is wanting the claw so generally characteristic of Oncids; the lip is eared, dilated at the end, and retuse. From Santa Martha. Introduced in 1847. Flowers in spring. Duke of Northumberland.

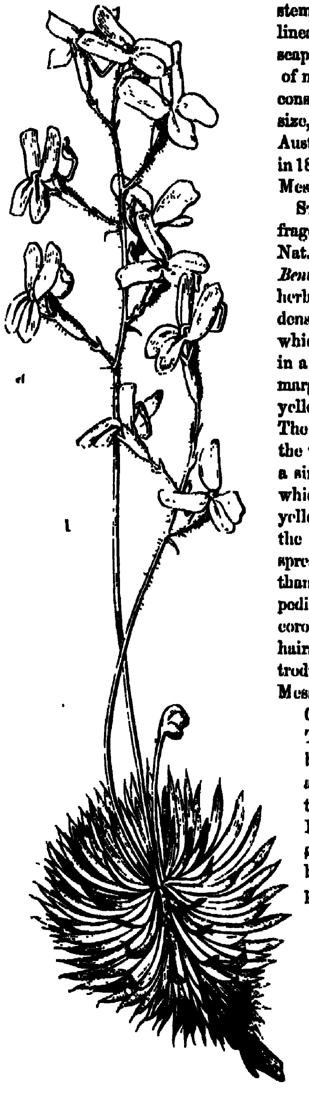
Lilium Wallichianum, *Schultes*. Dr. Wallich's Lily (*Paxt. Fl. Gard.*, i., 120).—Nat. Ord., Liliaceæ § Tulipeæ.—Syn., L. longiflorum, *Wallich*.—A noble, hardy, bulbous perennial, growing with a tall slender stem (? three to four feet high), two-thirds of which are thickly furnished with long, narrow, linear leaves, the uppermost drawn out into a linear point. The flowers are large, eight inches in length, the tube long and narrow, gradually widening into the ample spreading limb; they are creamy white and very fragrant: in the wild plants generally two or three at the top of the stems, but sometimes only one, as in the examples which have been bloomed in cultivation. It appears to be very near L. longiflorum. From the north of India: Almorah. Introduced, by Major Madden, in 1850. Flowers towards the end of summer. Botanic Gardens, Belfast, and Glasnevin, Ireland.

Hakea cucullata, *R. Brown*. Cucullate-leaved Hakea (*Bot. Mag.*, t. 4528).—Nat. Ord., Proteaceæ § Folliculares.—An erect growing and ornamental evergreen greenhouse shrub, four or five feet in height, with round, pale brown, very downy branches, and large alternate leathery leaves, which are heart-shaped, or between kidney and heart-shaped; stalkless, concave, waved, and minutely toothed at the margin; the colour is glaucous green. The flowers grow in copious clusters in the axils of the upper leaves, and are seated in the hollow formed between them and the stem; they are red, formed of four unequal, linear, glabrous sepals, bearing anthers on their spathulate apex, and have very long styles; these flowers are individually small, compared with other parts of the plant, but are rather showy from their number, and compact arrangement. From Australia. Introduced about 1846. Flowers in spring. Royal Botanic Garden, Kew.

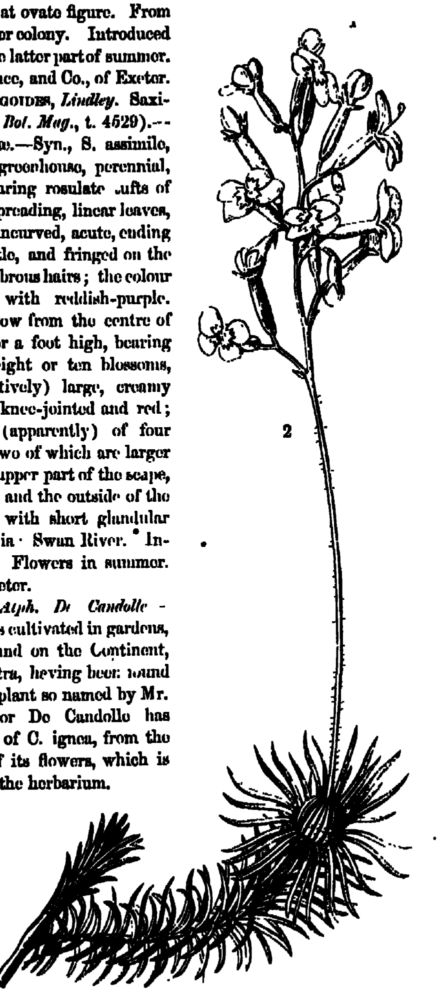
Stylidium mucronifolium, *Sonder*. Bristle-leaved Stylidium (*Bot. Mag.*, t. 4538).—Nat. Ord., Stylidiaceæ.—A very pretty greenhouse herbaceous perennial, with wiry roots, and tufted stems two or three inches long, copiously furnished with glabrous spreading linear-subulate leaves, which are each tipped with setaceous mucro. The scapes are terminal, six or eight inches high, bearing a compact oval panicle of numerous bright yellow flowers, the segments of which are marked with a conspicuous zigzag line around the mouth; these segments are of nearly equal size, and of a somewhat ovate figure. From Australia: Swan River colony. Introduced in 1848. Flowers in the latter part of summer. Messrs. Lucombe, Pince, and Co., of Exeter.

Stylidium saxifragoides, *Lindley*. Saxifrage-like Stylidium (*Bot. Mag.*, t. 4529).—Nat. Ord., Stylidiaceæ.—Syn., S. assimile, *Bentham*.—A pretty greenhouse, perennial, herbaceous plant, bearing rosulate tufts of densely imbricated, spreading, linear leaves, which are somewhat incurved, acute, ending in a long hair or bristle, and fringed on the margin with short scabrous hairs; the colour yellow-green tinged with reddish-purple. The flower scapes grow from the centre of the tufts, ten inches or a foot high, bearing a simple raceme of eight or ten blossoms, which are (comparatively) large, creamy yellow, the column knee-jointed and red; the flowers consist (apparently) of four spreading segments, two of which are larger than the others; the upper part of the scape, pedicels, ovary, calyx, and the outside of the corolla, are clothed with short glandular hairs. From Australia: Swan River. Introduced about 1848. Flowers in summer. Messrs. Veitch, of Exeter.

Cuphea ignea, *Alph. De Candolle*.—The plant, which is cultivated in gardens, both in England and on the Continent, as the C. platycentra, having been found to differ from the plant so named by Mr. Bentham, Professor De Candolle has given it the name of C. ignea, from the beautiful colour of its flowers, which is preserved even in the herbarium.



1. *Stylidium saxifragoides.*



2. *Stylidium mucronifolium.*

Catasetum fimbriatum, *Lindley* (see vol. i., 170).—According to Dr. Lindley (*Paxt. Fl. Gard.*) the Myanthus fimbriatus, *Morren*, described at the page above quoted, is a species of Catasetum.

Capanea grandiflora, *Decaisne* (see p. 35).—Dr. Lindley, in *Paxton's Flower Garden*, writes the generic name of this fine plant Campanea. Dr. Planchon, in *Van Houtte's Flore des Serres* (quoting Decaisne in the *Revue Horticole*, where the name was first published) writes it as we have done above.

SEEDLING CARNATIONS.

Nat. Order, Caryophyllaceæ.

Generic Character.—Dianthus, *Linnæus*. *Calyx* embraced at the bottom by two or more imbricated bracts, very rarely without bracts; tube cylindrical, or sometimes clavate or turbinate, five-toothed. *Corolla* of five petals, inserted hypogynously at the apex of the distinct stalk-like or cup-shaped carpophore; claws linear, elongated; limbs crenate, dentate, or laciniate, very rarely entire, naked or bearded at the base. *Stamens* ten, inserted with the petals; *filaments* filiform; *anthers* two-celled, bursting longitudinally. *Ovary* one-celled; *ovules* numerous, inserted on a thick central columella, amphitropous; *styles* two, filiform, stigmatic on the inside. *Capsules* papery, cylindrical or oblong, one-celled, bursting from the summit down to the middle by four teeth or valves. *Seeds* numerous, horizontally or obliquely imbricated on the thickish central column, oval or oblong, depressed, rather convex on the back, the margin thickened on the face, more or less distinctly keeled, hilum central. *Embryo* excentric in farinaceous albumen, parallel to the hilum, approached to the back; *cotyledons* plano-convex; *radicle* terete, produced, irregular.—Herbs or shrubs growing in Europe and Northern Asia, more rarely in N. America and the Cape of Good Hope; stems articulated with knots; leaves opposite, mostly connate at the base, grass-like, linear, more rarely lanceolate or oblong; flowers terminal, solitary or cymosely panicled, corymbose, fascicled or crowded into heads.

Sect, **Caryophyllum.**—*Flowers* solitary, or many together, crowdedly arranged in simple or compound cymes, now and then collected into bunches, with a many-leaved, herbaceous, universal involucre, or none. *Calyx* cylindrical, herbaceous, papery or parchment-like, striately many-nerved, embraced by two or more herbaceous or parchment-like, imbricated bracts at the base, entire or very rarely split in front. *Corolla* salver-shaped, the linear claws of the petals dilated into the limb.—Herbs or under shrubs.—(*Endlicher*, *Gen. Plant*, 5244).

Dianthus Caryophyllus, *Linnæus*. Clove Pink. Stem branched, flowers solitary; calycine scales (bracts) four, very short, ovate, rather mucronate; petals very broad, beardless; leaves linear, awl-shaped channelled, glaucous.

Var. flore-pleno.—The double state of the Clove Pink, includes the florists' varieties of Carnation.

Carnations.- 1. *Puxley's Emperor.*
2. *Puxley's Jenny Lind.*
3. *Barrenger's Duke of Devonshire.*

DESCRIPTION.—For the very splendid Carnations represented in the accompanying plate, we are indebted to Mr. Turner, of the Royal Nursery, Slough, who kindly forwarded them to us from the Great trial Exhibition at Derby, where each took the leading prize in its class. Jenny Lind, the crimson Bizarre, was raised by the veteran J. L. Puxley, Esq., Tenby, Pembrokeshire, in 1848. It is, in Florist's phraseology, a very true marker, of good constitution, winters exceedingly well, and will carry several blooms upon a plant large enough for exhibition in any stand. The colours are remarkably rich, richer than in any crimson Bizarre at present in cultivation. It has been matched, we are informed, for £50, against Haines' Black Diamond, a flower of which we have a drawing; and they are to be shown next season. Emperor, scarlet Bizarre, was also raised by Mr. Puxley in 1848, and is a remarkably large and showy kind, of good habit and free growth. It is a fact worth recording that Mr. Puxley, though an extensive grower, has only two kinds in his garden which were not raised by himself. Duke of Devonshire, scarlet flake, is a seedling of Mr. Barrenger's of St. Cuthbert's, Bedford, and is a very evenly marked and excellent flower, rather small in our specimen, but still a fine flower. It is said to be of good constitution and very free.

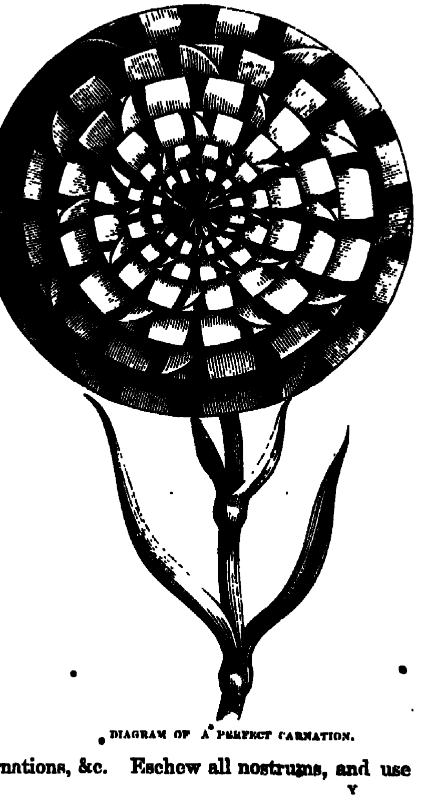


DIAGRAM OF A PERFECT CARNATION.

Culture.—The following remarks on preparing compost for Carnations are from the pen of a very successful cultivator, J. W. Newhall, Esq., of Woolwich, and we doubt not will be found interesting:—"It will soon be time to mix the compost for the next year's potting of Carnations, &c. Eschew all nostrums, and use about two thirds good staple loamy soil, preferring the turfy top spit, with one third of rotten cow or stable dung, adding about one measure of drift sand or other sharp grit to ten measures of the above.

Those who are in the vicinity of rivers, mill heads, or other streams or sluices will find that the mud or alluvial deposit of such watercourses will be a most excellent substitute for maiden loam. We have grown our plants in the mud which is of necessity periodically cleaned out of the ditches in Plumstead marshes, for some few years with success, much better than we ever did in any loam we have been able to obtain in our neighbourhood.

This mud is full of reeds and other aquatic plants, and when thrown up high and dry, those plants soon decay, and when thoroughly reduced to soil is not to be in any way distinguished from a fine fat hazel loam. Certain friends of ours also, who live on the banks of the Ravensbourne, have for many years used the alluvial mud, the cleansing of a mill-head, and it is impossible to grow Carnations finer than they do.

One hint on winter potting: do not make a hole in the soil in the pot, and so, as is too much the practice, plant with the roots in a perpendicular direction, but drawing shallow hollows on the surface, spread the roots as horizontally as possible, and after drawing the earth over them press it gently but firmly down in that position."—A.

THE PROPERTIES OF THE CARNATION.

First. The flower should be not less than two and a half inches across

Second. The guard or lower petals, not less than six in number, must be broad, thick, and smooth on the outside, free from notch or serrature, and lap over each other sufficiently to form a circular roseate flower, the more round the outline the better.

Third. Each row of petals should be smaller than the row immediately under it; there should not be less than five or six rows of petals laid regularly, and the flower should rise and form a good bold centre or crown; and in quantity should form half a ball.

Fourth. The petals should be stiff, and slightly cupped.

Fifth. The ground should be pure snow-white, without specks of colour.

Sixth. The stripes of colour should be clear and distinct, not running into one another, nor confused, but dense, smooth at the edges of the stripes, and well defined.

Seventh. The colours must be bright and clear, whatever they may be; if there be two colours, the darker one cannot be too dark, or form too strong a contrast with the lighter. With scarlet the perfection would be a black; with pink there cannot be too deep a crimson; with lilac, or light purple, the second colour cannot be too dark a purple.

Eighth. If the colours run into the white and tinge it, or the white is not pure, the fault is very great; and pouncy spots or specks are highly objectionable.

Ninth. The pod of the bloom should be long and large, to enable the flower to bloom without bursting it; but this is rare; they generally require to be tied about half way, and the upper part of the calyx opened down to the tie of each division; yet there are some which scarcely require any assistance, and this is a very estimable quality.—*Glenny's Properties of Flowers.*

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THE POTENTILLA: ITS CULTURE AND PROPERTIES.

By Mr. G. GLENNY. F.H.S.

THIS showy perennial stands a fair chance of being "elevated to the rank of a florist's flower," and if a few of our growers of hardy subjects would set about raising seedlings, we should soon have large round flowers without indentation, and distinct variations in the colours. Mr. Hopwood of Twickenham once found among his bed of Potentillas the remarkable variety called Hopwoodiana—one of the most showy of the family; but he never could discover whether it was a seedling or a sport from one of the varieties already in the collection. We incline to think it was a seedling, because its form and size were both superior to most of the varieties known before. Had this plant been produced by any one of our known florists, or been exhibited in its seedling state, or before it was let out at the Horticultural shows, it had been a little fortune. As it was, it produced but little; it was let out perhaps, at double the price of the common ones, but there was no demand. The trade had it by degrees, and it continued a marketable plant. It is even now one of the best, if not the very best, we have, although we believe Mr. Plant, of Cheadle, has raised some that will come up with it.

The Potentilla is one of those perennials which give but little trouble. The border need not be prepared differently from ordinary perennial borders. It should not be too stiff, because that agrees with very few; and it should not be too rich, as that would promote large growth and little flower. There is a good choice of varieties for a beginner. Some of the best are:—Insignis, which is yellow; Brilliant, a rich scarlet; Plantii, a scarlet border, with yellow centre, very distinct and showy; Garnerianum, primrose blotched with rose; Thomasii, rich yellow; Hopwoodiana, pink and white; Russelliana, crimson scarlet; McNabiana, crimson and white; Menziesii, rich crimson; Formosa, rose; Atrosanguinea, deep crimson; O'Brienii, orange; and Rubra aurantia, red and orange. Nothing would look better than a bed of these neatly arranged as to colours; and we should certainly confine ourselves to a few of the best, and most remarkable; for instance: Hopwoodiana, which we think at the top of the list; the best yellow, either Thomasii, or Insignis; McNabiana; Rubra aurantia; Plantii; Brilliant; Garneriana; and O'Brienii. They must have plenty of room or they are apt to be drawn up too much. Let them be in an open situation, to keep them within moderate growth, and of good habit. They are propagated by parting the roots, but they do very well two or three seasons without parting if they have abundance of room. If they are placed on a diversified perennial border, they must not have tall plants close to them; and they must be occasionally denuded of their withering leaves, and cleansed of slugs, earwigs, and other vermin, which always harbour in their thick bottom foliage. When they are parted you must be careful to have a fair portion of root to each piece separated from the old plant; and they must be well watered in when the separated peices are planted.

The seed may be sown in a common border, and when they are large enough to handle, they may be planted out a foot apart in a store-bed till they flower, when every one that is not better than we possess already, should be thrown away as soon as it comes into bloom.

Properties.—The Potentilla should have round flowers, free from indentation, thick in the petal, smooth on the edge, and quite flat; the colour distinct, and if two colours, the contrast very decided; no green to be seen beyond the edge of the flower.

The plant should be dwarf and shrubby; the main flower stalks short, but the footstalks long enough to keep the flowers from touching each other; without leaves on the stems. Foliage bright green; flowers abundant, clear of the foliage, but no more.

It follows from this that long straggling stalks throwing up the flowers in a straggling way like many of the species, with bunches of foliage about them, and mops of confined flower buds opening one or two at a time; as well as flowers with great division in the outline, forming almost a five-leaved "wind-mill," with the five petals small in proportion to the plant, and scanty in numbers according to the quantity of foliage, must be bad. There are some of the Potentillas little or no better than weeds. It behoves any one therefore to see all of them before they condemn any; for if a man's opinion of the flower were founded on two or three of the worst sorts, the very name would deter him from trying those unseen. Certain it is that the plant has become unpopular among a large class, who never saw the better ones, but decided upon the merits of the family by the qualities of two or three members, that are really not worth a place in English gardens.

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THE PELARGONIUM HOUSE.*

By W. P. AYRES, C.M.H.S., Brooklands, Blackheath, Kent.

IF the object in constructing the Pelargonium house is only to grow the plants to the greatest possible perfection, then a house of very simple form will be sufficient; but if it is deemed advisable to build a house, which, in addition to being suitable, shall also show the plants, when they are grown, to the greatest advantage, then some little consideration is necessary.

Of course a house that is suitable for the ordinary Pelargoniums, would also do for the fancy kinds. Such houses as we see then among the London exhibitors—who are, doubtless, the best cultivators in the world—are very simple in construction, being low *lean-tos*, with a front platform, and a stage within three feet of, and placed at an angle of inclination, so as to run parallel with the glass, and thus bringing all the plants the same distance from it. These houses, in some cases, are heated by hot-water; but those in which Mr. Cock, of Chiswick, grows his plants, and also those used by Mr. Parker of Roehampton, Mr. Gaines, Mr. Catleugh, and others, are heated by the common flue. After this, it is unnecessary to say anything in advocacy of the flue; we have proof that it will answer; but as hot-water pipes are neater, those who have the means may use them. Ventilation is secured by the sliding sashes, and also all round the house by the front and end lights, and thus a current of air is secured at all times. In Mr. Beck's houses at Isleworth, and also in all our own plant-houses, provision is made for admitting air in bad weather through apertures near the heating apparatus, thus warming the air before it passes among the plants—a thing of great importance in frosty weather, and during the prevalence of east or north-east winds. Nothing is more injurious to soft-wooded plants of all kinds than cold draughts of dry air—its effect is that of drying the tissue of the plants, thus turning the foliage brown, and rendering the plants what cultivators term "foxy;" but if the air is both warmed and moistened before it comes in contact with the plants, no such injury can be done, and two great points are gained, viz., abundance of air at all times, and that in a suitable condition to benefit the plants.

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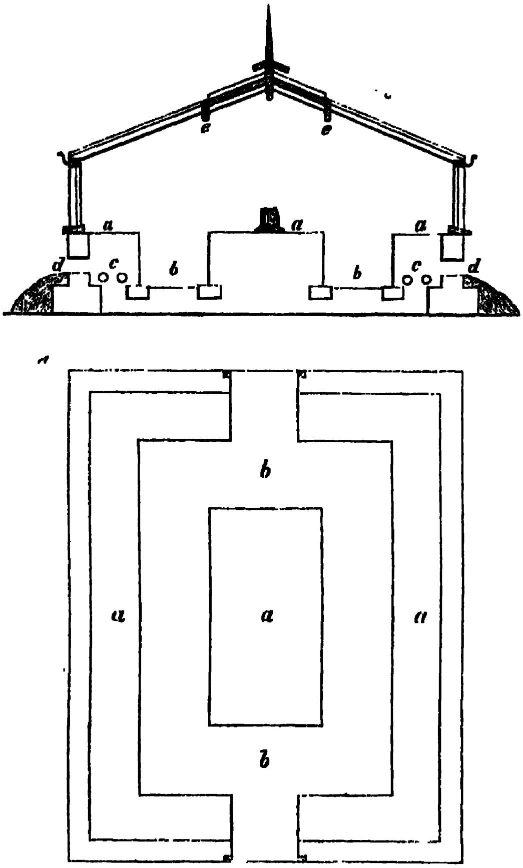
* From *The Fancy Pelargonium* now in the press.

From the preceding remarks it will be seen that the main requisites in growing Pelargoniums are, first that the plants be placed as near as possible to the glass at all seasons; and, secondly, that they be freely ventilated, taking care in cold weather that the air is in proper condition, both as to temperature and humidity, before it comes in contact with the plants. We have yet only been considering houses, in so far as their utility is concerned; we shall now go a step further, and see whether a house cannot be made useful, and at the same time somewhat ornamental, and that too without any material increase in the expense of construction.



Reference to Plan.

a, Platform; b, Path; c, Hot-water apparatus; d, Ventilators; e, Purlins to support rafters.

Now it will not, we suspect, be disputed, that of all forms for a plant-house the span-roofed one is the best; inasmuch as it admits light freely on all sides, and in addition admits of free ventilation in unfavourable weather, on the side opposite to the current of air at the time. We, therefore, recommend as the most suitable construction, a house running north and south, twenty-four feet long and eighteen feet wide, with a platform round the sides three feet wide, and a stage in the centre of the house six feet wide, thus leaving room for a path round the house three feet wide. Such a house is represented by the annexed engraving, and it is six feet high on the sides, and ten feet high in the centre, and the ends being hipped, the plants are in all parts as near to the glass as is necessary.

It may, and no doubt will, be objected to a span-roofed house by some, that for purposes of exhibition it is necessary that the flowers be brought to a face, that is, all to stand the same way. To some extent this is true; but at the same time it must be recollected, that when plants come to be judged for superlative cultivation and perfection in every part, it is possible that the plants will be required to be all face, that is perfect on all sides, and then one-sided plants will be no longer tolerated. The time will come, and that before many years are past, when plants will be judged for perfect cultivation, possibly in single rows, so that they may be seen on all sides, and then those who grow them in span-roofed houses, will find that they were wise in time. The mechanism of plants manufactured, though necessary to some extent, we only care for, so far as it is instrumental in bringing rude growth into symmetrical forms; but it is quite certain that a plant to be perfect, must be furnished alike on all sides, and this can only be effected by all sides being alike exposed to light; therefore, a span-roofed house is the only form of house in which such an object can be attained.

In the house represented by the annexed engraving, we have studied to combine economy with suitability; and we imagine, if our directions are followed, it may be built very much cheaper than such houses are generally constructed. The great expense of all horticultural building, of a plain description, is not the materials, but the labour; and hence, to diminish the labour, is to secure a great saving. Now, in all greenhouses the expense of making the sashes is the principal one, as they take considerable time. We, therefore, propose to do away with the sashes, except in so far as they are necessary for ventilation, and to glaze the other part of the roof as a fixture. From the plan of the half of the roof, Fig. 2, it will be seen that the ends are hipped, and that a purlin *e e*, is introduced longitudinally, and from the purlin to the ridge of the roof, light rafters are placed to support the sashes. These are made to slide by means of cords and pulleys; and to guide them, and likewise keep them in their places, small grooved brass wheels are let into the sashes, and so as to work upon the astragals below them. The wood-cut explains the plan so well, it is not necessary for us to dwell upon the subject here, as any builder of ordinary penetration will readily see how such a house should be constructed. Ventilation is secured by the end and side-lights, as well as by the ventilators *d*, which are nine inches deep and eighteen inches long. The house may be heated either by the hot-water pipes *c c*, or a flue may be built in the same place, but then one doorway must be abandoned, so as to carry the flue round the house. The house itself, if only for the sake of appearance, should be elevated ten or fifteen inches above the surrounding soil, and it may be entered by a step or two at each end. The advantages of this arrangement, in addition to cheapness, is superior lightness, as, instead of heavy rafters, and considerable shade, every three or four feet, with the exception of the main supporters, have nothing more than astragals or sash-bars introduced.

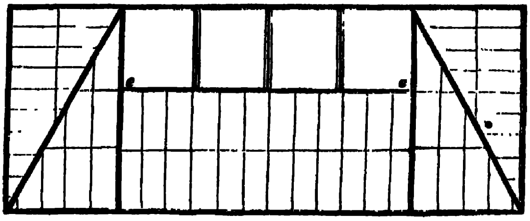


FIG. 2.

For the internal fittings we should prefer slate, and would raise the plants when necessary by inverted pots. One row of specimen plants would be grown round the sides, and three rows by using the inverted pots upon the centre stage. The expense of such a house as we have described, should not exceed, if glazed with the best sheet glass in large squares, £70; and a nurseryman doing his own work, would build it for considerably less. The quality of glass we should recommend would be good crown; but, if properly attended to, we see no objection to good sheet: under it plants may require a little more shade, but the plants in a Pelargonium house will not sustain any injury after the end of March, if the house is covered permanently with the hexagon netting—which will also serve to exclude the bees.

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A FURTHER GLANCE AT MODERN FLOWER-GARDENS.

By Mr. R. ERRINGTON, C.M.H.S., Gardener to Sir. P. Egerton, Bart., Oulton Park.

HAVING dealt with clumsy or unwieldy forms amongst flowers, as connected with the parterre, I may now beg permission to refer to some plants possessing the opposite quality of elegance and gracefulness.

Every one admires the neatness and lightsomeness of the old Liatris spicata; a prettier object can scarcely be conceived, when nicely grown. The old Chelone barbata, too, a plant admired by most: what elegance a plant of this peeping here and there among the grosser and flat-headed herbaceous plants imparts! The small-flowered Anthericum, too (Liliastrum ?), a plant altogether dressy and chaste looking. Verbenas of the taller kinds, neatly tied up, are of excellent habit. The lighter foliaged Phloxes, too, such as Van Houttii, and such Veronicas as the white spicata, incana, carnea, incarnata, &c., have much elegance. Let such forms as these be compared with coarse Asters, Rudbeckias, Tradescantias, Aconitums, Pulmonarias, and a host of other heavy-leaved and flat-headed flowers, and it will be obvious that form or habit has much to do with the beauty of the parterre. I do not mention these plants as worthy of utter rejection—this is a matter of fancy; but merely by contrast to throw light on the subject, and to point to the propriety of having what I call transition scenery—before alluded to—to which all things rejected from the parterre might be removed, and where the very points for which they were excluded would form their principal recommendation.

I may here be permitted to remark on the benefits of a reserve garden; no place of any pretensions should be without this useful adjunct of good gardening. Where flowers are grown extensively, and high culture is aimed at, a young man who had been accustomed to plants and flowers would here find constant employ from April until September; especially if a propagating pit or two, and some cool pits for hardening off, were contained within the boundaries. Such should always be the case, and thus this division of the business, although subservient to the general scheme, would form a distinct branch, and leave the other portions of the establishment perfectly unfettered. For what benefit can be derived from cramming Melon or Cucumber frames, or the Vinery or Peach-house shelves, with a host of small fry intended for the flower-garden? Such may be justified by necessity, but never by principle.

As bearing on this portion of the subject, I would here point to the propriety of cultivating annually some of the herbaceous tribes, which become coarse and exhausted by standing long in one situation. Phloxes, Asters, Pentstemons, and indeed most herbaceous plants, blossom incomparably finer from young plants propagated betimes in the preceding summer, than from the old and exhausted stools which we generally see in pleasure grounds. This then would be one legitimate object for the reserve ground, where, indeed, an alphabetical or some other arrangement of plants considered permanently useful should be kept up; many kinds becoming entirely lost for want of such an arrangement.

I would now try to refer again to the clumping system, and to offer a few remarks on pegging-down, &c. One of the first essentials I would suggest, is to keep up the idea of distinctness; confusion of forms is surely out of place here. Let the Brambles and Dog Roses in the wilderness intertwine and smother each other as they will, but distinctness, I say, for the parterre. Now, it is worth while to examine into this principle. The first point of distinctness I would urge is the propriety of keeping every individual flower separate—no two allowed to touch. I know not who might be the real originator of this idea as applied to flowers, but the late clever and ingenious Mr. Loudon was, I believe, the first to make it patent amongst the lovers of gardens. "The recognition of art" was a favourite motto of his; eschewing boldly, as he did, all hybrid mixtures of the true picturesque and the simply beautiful. There can be little doubt, therefore, that what he chose to designate as the "recognition of art" is a real principle, having its foundation in the human mind, and consisting in a desire to distinguish, separate, and recognise what are termed styles, and to avoid unmeaning confusion. This then is, I conceive, the only principle which can guide the flower-gardener; and it is well, in recognising such a guide, as well as due attention to form and outline, that no sacrifice is called for from the greatest stickler for *mere* colour.

The thing mostly to be repudiated is that pell-mell sort of style, which, content with a blaze of colour alone, bids defiance to all expression through the medium of form and outline, by fusing all into an unmeaning and chaotic mass. I feel persuaded that, where beds of flowers are well conceived, the plants individually healthy, and blossoming freely, the relief afforded by intervening portions of cleanly raked soil is just the sort of relief that suits the human eye in the majority of cases. As for those who require merely to be taken by surprise, through a prurient and false taste, why mere blazes of colour and sparkling contrasts must, in the main, be the order of the day.

Next to the individuality of the plants in a given bed, I would suggest that the use of edgings or borderings will be frequently found a useful adjunct in promoting beauty of outline. No flower-bed ever looks to me perfectly satisfactory without at least two distinct heights, if three so much the better. Now, this admitted, no one will doubt the propriety of placing the lowest next the exterior of the bed, however the other heights may be arranged. Here, then, an edging of some kind makes an elegant and artistical finish; and, as I think, edgings sometimes look best if they can be made to form continuous belts; this is easily accomplished by pegging-down well during the earlier stages, allowing the points to rise in relief as soon as the object shall have been attained. To put a case; suppose a long oval bed standing in considerable relief. A row of the Scarlet Cupheas as an edging, no part of them allowed to approach the outer edge of the bed nearer than four inches. In a parallel line, at fifteen inches, let a row of variegated Geraniums be planted. And now let the interior be furnished with the Lobelia fulgens, the latter planted in groups of fives. This combination of colours may appear exceptionable to some minds, but this bed would always give satisfaction as far as form is concerned; and the Cupheas might be planted so as to form a continuous band or belt.

There are many other dwarf flowers, however, better adapted than the Cuphea for this purpose; such as the various Verbenas, Kaulfussia amelloides, the Myosotis family; the Lobelias—Erinus, erinoides, bellidifolia, &c.; Lupinus nanus, Anagallises, Leptosiphons, Musk, Pansies, Chryseis, Heliotropes, Petunias, &c. &c. Such, to which several more might be added, are perfectly eligible for this purpose. This band or edging generally looks best if kept distinct from the rest of the bed, and certainly from the edge; it is more artistic, and by consequence more dressy; and the narrow margin of soil around, if kept clean raked, will give a cleanly finish to the whole, and afford a wholesome relief to the eye.

One of the most admired beds this season, in a flower-garden here, is thus composed:—Pansies of various colours (the yellow selfs most prevalent) round the exterior, pegged down early in the season, and made to blossom well late; next, some compact variegated Geranium bushes; the interior filled up with the Salvia patens. None of these are allowed to touch, if possible, and it really is the gayest bed I ever saw; although no doubt Monsieur Chevreul and other artistes would object to the combination of colours. As for the latter principle, painters may talk as they please about harmony, &c., but it will be found in general that the stongest contrasts please the best with most minds. All men are not painters or poets; and if the endeavour is to be that of pleasing the greatest number, why, I suppose we must even fall in with prevailing impressions.

High keeping is, after all, one of the chief elements of success in flower gardening; no combination of colours or forms can give perfect satisfaction, if neglect or untidiness appear. The rake should be frequently in use where bare soil appears; weeds, of course, are entirely out of the question. All coarse and disproportionate foliage should be timely removed, and all decaying blossoms constantly trimmed away. Pegging down should be performed as early as possible in the season, in order that the trusses of flowers may stand fairly in relief, and wear an air of freedom combined with neatness. Tying up or staking also requires a little nice handling. In the first place, all stakes or sticks, of whatever kind, should be so coloured as to be as far as possible inconspicuous. For this purpose, perhaps, no better model presents itself than the very sober green of an old mossy wall, or the stump of a tree. To give the stakes another colour would be to attract attention; to paint them of a fine fresh green would be to institute an invidious comparison between them and the foliage. The tint here alluded to is a sort of bronzy green, such may be seen on every moss-grown tree in shady woods. Ordinary coppice sticks, however, are very good where attainable, if straight; of course neither dressing nor paint are requisite. It is barely necessary to name that timely tying up and staking are of the utmost importance. Flowers once suffered to become crooked are a long while before they regain their position; and most inelegant the finest of flowers look, if suffered to get into *dishabille* through lack of this needful operation. Another point bearing on the principle of proportion as well as artistic appearance; rambling or fast-spreading flowers should be kept within bounds. What looks worse than an overgrown Pansy, exhausted with long flowering, presenting nothing to the eye but lank stems and wasted out or faded blossoms? How different the fresh blooming Pansy in early summer—all vigour, compactness, and beauty! The Pansy, however, I merely quote as typical of numerous things in the parterre, which want a timely trimming, in order both to render them compact, and to perpetuate their flowering.

In the selection of plants for flower-garden purposes, durability of flowering, in the main, should be made the key-stone of the arch. Those who can afford to have a changeable flower-garden need not, of course, be so much influenced by this principle; having plenty of material and labour at command, they can have their beds decorated in early spring with Scillas, Bulbocodiums, Erythroniums, Hepaticas, Sanguinarias, and other precocious gems, and these succeeded by a system of early-sown annuals, the latter, of course, to be withdrawn the moment they begin to fade. In carrying out a system of this kind, the bulbs would, of course, require to be taken up in May, to give place to the massing flowers which would have to occupy their place.

There is little doubt that the propriety of some of the advice here offered will be impugned by some who have become completely wedded to the ordinary massing system. Such persons may urge what they will, but they may rest assured that public taste is somewhat of a kaleidoscopic character; and it is easy to see that the dissentients of the clumping method have been on the increase during the last three years; at least that system as confined to self-coloured masses of one kind. Will it not be well, then, to anticipate and prepare for any coming change?

THE CULTIVATION OF ROSES IN POTS.—FIRST SEASON.

By Mr. J. Saul, Durdham Down Nursery, Bristol.

It is only within the last few years that the cultivation of the Rose in pots has been attempted, and the beautiful specimens now shown annually at the London fêtes by the great Rose growers, and amateurs, have proved how admirably these plants are adapted for the purpose. Withdraw these splendid collections from the shows of May and June, and a blank will be left not easily filled up; for if any one feature in those assemblages of beauty is more inviting or attractive than another, it is the Roses of superlative beauty, which are admired by all. Now, although in the neighbourhood of London these beautiful collections are to be seen, yet at the provincial shows such collections are very rare, evidently showing that their cultivation through the country, as pot plants, is limited—very limited indeed; though they are much easier grown, and at less expense, than a collection of Geraniums or Fuchsias, as I shall endeavour to show.

In commencing their culture, I would advise that all the strong growing varieties be procured in the autumn. By strong growers, I mean such as the varieties of Hybrid Provence, Hybrid China, Hybrid Bourbon, French, Moss, Alba, Hybrid Perpetual, the strong growing Bourbons, and Noisettes; in a word, all such as are strong growers, and are usually worked upon stocks in the nursery quarters. The delicate Bourbons and Noisettes, together with the Teas and Chinas, should be left to be procured in spring. When the Roses are had home in the autumn, examine the stocks minutely, particularly among the roots, cutting out any decayed parts, knots, the remains or rudiments of suckers, topping any wounded or bruised roots, and having all well looked over before they are potted, as no such opportunity will offer again. I would cut back the head about a third; this I consider sufficient for the present; about the end of February or beginning of March they must be cut back to from two to four eyes.

The soil I prefer is good turfy loam, rather stiff or adhesive, and well decomposed cow-dung, used in about equal parts. With these two simple ingredients, Roses may be grown fit to grace the grand Exhibition of 1851. I am aware some of the best Rose growers of the day use burnt earth with advantage; this I have also used rather extensively, also charcoal; but from neither could I see the least advantage derived; on the contrary, the plants never thrive so well as those potted in the simple mixture of loam and cow-dung. I need scarcely remark, it should be used very rough, merely chopping the loam in rough pieces. In potting, let the pots be well drained, with at least from one inch to one and a-half inch of broken crocks, used in large rough pieces, having the concave side downwards. The pots should not be over large, from six to eight inches inside the rims will be sufficient, according to the size of the plant, the condition of its roots, &c.

When potted they should be plunged to their rims in coal-ashes, or any garden soil, on an inverted flower-pot, leaving a cavity underneath each to prevent the ingress of worms. In this state they may remain until about the middle of May, when they will require a shift. The same soil as before should be used, but if possible more rough; and they should be again plunged as before. Through the summer they will require constant attention as to watering, &c.; they should have liquid manure at least once a week, using soft water at other times. The sort of liquid manure I prefer is the drainage of dunghills, sheep or cow-dung steeped, the water of which should be used clear; in fact, any good, rich, liquid manure. Guano is excellent, but it requires very great caution in using, from its variability as to quality; I have frequently known amateurs and gardeners destroy their plants by using it, though great caution was exercised; if therefore, it is used, err on the safest side, and give it weak—say half-a-pound of guano to eight or ten gallons of water. During summer they require constant attention, in taking off all suckers that may appear, as well as all flower-buds—they being not intended to bloom this season. If the plants are too crowded with wood, they should be thinned out moderately, that the remaining shoots may the better perfect their growth. All strong gross or watery shoots should have their extreme points pinched off before they get long, say at six or eight inches; they will soon break out afresh, and add to the bushiness of the plant. If all goes on well, these plants will, about the beginning of August, require another shift, which should not be over large. They must be treated in every respect as before, until the end of September, when they should be shifted into their blooming pots.

We shall now retrace our steps, and bring with us those delicate varieties which were to be procured in spring, namely, the delicate Bourbons, Noisettes, Chinas, Teas, &c. I will suppose they arrive at the end of March—a good time. They had better be put in a cold frame or pit, and kept rather close for a few days, or a week, until the plants recover from the effects of the journey; after which they must have abundance of air; and in about a fortnight they may be safely shifted. The soil may be, as recommended for the others, rough turfy loam, and well decomposed cow-dung, with the addition of from one-fourth to one-third leaf mould; this latter is very suitable for the more delicate Teas, &c.;

strengthening food can be given, in the shape of liquid manure, during the season of growth. This shift should not be a liberal one, rather the contrary, but it is impossible to mention any particular size for the pots, as that must be regulated by the size of the plants, the state their roots are in, or whether they are Bourbons or Teas, as the former will in general take a more liberal shift than the latter. When potted, they must be put in a cold pit, or a similar situation, and kept near the glass, running the lights off every fine day, and tilting them up in bad weather, in order to give the plants as much air as possible. At night, however, the lights must be put on until the middle of May, for fear of spring frosts, which are more injurious to these delicate Roses early in spring—as they commence growing early—than many degrees would have been when the plants were dormant in the depth of winter. From the second to about the third week in May the lights should be considerably tilted up by night, to allow a circulation of air among the plants; after which time the lights may remain off altogether, except in the event of any heavy, dashing rains, when they ought to be put on.

During summer these plants will require the same attention as those already noticed, namely, disbudding, thinning out moderately the shoots where over-crowded, pinching off the points of strong shoots; and, when any sign of green-fly makes its appearance, syringing with a mixture of tobacco liquor and water in about equal parts. About the middle of June these plants will require another shift, which should be more liberal than the preceding, more particularly to those which have grown freely. The same kind of soil as on the former occasion is to be used, and when shifted they are to be placed back in the same situation, following the same routine of treatment as before. I should have observed that manure-water must be given from the time they receive their first shift in spring and continued through the summer; at first it should be given but seldom—say, once in ten days or a fortnight, but as the plants progress in growth it may be given once a week, and continued until the end of September, watering with soft water in the intervening time.

We have now brought both collections to the end of September, the time when all are to be shifted into their blooming pots. If ever a shift were to be given with care this is the one, as much of the health and beauty of the plants will depend on how this is performed at the present time. If it is not now properly executed it is useless to expect good plants next season, and all past trouble and attention will have been in vain. The size of the pots will vary according to the strength of the plants, their classes, &c.; the Teas, Chinas, &c., if good plants, which by this time they ought to be, may go into pots about nine inches in diameter; the Perpetuals and Summer Roses into pots about twelve inches in diameter; whilst some of these latter classes will be strong enough to go into pots fifteen inches in diameter or more. Drain well, as recommended on former occasions, putting at least two inches in the nine-inch pots, and three inches in the larger sizes, and using large pieces of crocks, having, as before observed, the concave side downwards. The soil used is to be the same as in the preceding shifts, namely, stiff loam and cow-dung for the strong growers; the same with the addition of leaf mould for the delicate growers; the mould must be chopped very rough and thoroughly mixed. I shall have more to say on this subject of potting.

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Miscellaneous Notice.

Sulphurating Machines.—Since our notice of Mr. Fry's useful contrivance, another machine has been brought under our notice by Mr. Epps, nurseryman, of Maidstone—an instrument which Mr. E. has registered in Britain, France, and America. It differs from Mr. Fry's, inasmuch as it is much more powerful, as it forces the sulphur to a considerable distance; and, directed against a bunch of Grapes at the distance of ten feet, the power is sufficient to force the sulphur into every part of the bunch. The sulphur, instead of being placed over the fan, is deposited in an oscillating box in front of the fan-blower; and connected with the box is a sifter through which the sulphur passes into the tube, from which it is projected into the air, thus securing uniformity of delivery, and avoiding all clogging of the machinery. The oscillating motion necessary to ensure the constant movement of the sieve, is obtained by a lever and cam, which are worked by the rotatory motion of the wheels that work the fan-blower. We are informed it is Mr. Epps' intention to manufacture his machine of various sizes, and some of them sufficiently large to be used for destroying the mildew frequently so destructive to the Turnip, and other agricultural crops; indeed, we see no reason why dry, concentrated manures, for top-dressing crops, could not be distributed by a similar contrivance, with much greater uniformity than it is possible to distribute it by the hand.

While writing the preceding, we received an improved machine from the inventors, Messrs. Fry and Alsop, and having tested it, we can pronounce it very superior to the machine noticed last month. In this machine the sulphur hopper is placed before the blower, and the sulphur is delivered into the tube by means of a graduated spindle passing through the lower part of the hopper, and attached to a wheel, by means of which uniformity in the delivery of the sulphur is secured. This machine may also be used as a fumigator, the tobacco being placed in a wire-gauze bag, which is passed into the tube of the machine, and so as to admit of a free current of air on all sides. This scheme we consider superior to Brown's, as it prevents the machinery being injured by the condensation of the smoke, which does considerable injury to the other machine. The blast of this machine is much more powerful than the one before noticed, and for horticultural purposes will answer every purpose.

We notice these machines thus prominently, from a conviction that sulphur has not been used so much in gardens as it ought to have been, and will be, now that these machines render its distribution so expeditious and economical. The thousands of pounds lost annually in our Hop-gardens, for the want of the means necessary to eradicate mildew, is notorious; and every gardener knows, that, from the same cause, he has great difficulty in procuring even the shadow of a crop of Peas after the main summer crops are over. We saw, however, the other day, a row of Peas, part of which had been sulphured directly the mildew made its appearance; the sulphured part bore an excellent crop, while the other part was entirely worthless. In many seasons, from the attack of mildew, it is impossible to procure anything like a remunerative crop of seed from some of our best vegetables, such as Cauliflower, Brocoli, late Peas, Radish, Lettuce, &c.; but with these sulphurators, mildew is divested of its terrors, and, other things being equal, profitable crops of all kinds rendered certain.—A.

THE GARDENERS' AND NATURALISTS' CALENDAR FOR NOVEMBER.

FLOWER-GARDEN.—IN-DOOR DEPARTMENT.

Conservatory.—By this time the plants are all in their winter quarters, and some of the more forward of the Camellias will be swelling their buds. Encourage these by placing them in a warm part of the house. Syringing must now be discontinued, except occasionally very lightly on warm sunny mornings; but sprinkle the house daily, so as to keep a moist, but not saturated, atmosphere. Ventilate freely, avoiding cold draughts; but do not at present use more fire than is indispensably necessary, as the more dormant the plants are kept until after Christmas the better it will be for them.

Orangery.—Here former directions must be attended to, avoiding cold draughts and maintaining a temperature of from 40 to 50 degrees. The fruit will now be hanging in all its golden beauty, but do not gather it until it is quite ripe. If any of the trees are filthy, take advantage of bad weather to have them thoroughly cleansed, by washing them with soft-soap and water. Give no more water to the roots than is necessary to keep the plants from drooping.

Forcing House.—If flowers are much in request, introduce such of the bulbs as are fit; and a few Kalmias, Rhodoras, Azaleas, &c., may also be started slowly at the cold end of the house; and for the sake of the scent, a few established plants of Sweet Brier may also be introduced. Violets in frames will be blooming freely in most situations; but where such is not the case, a few pots may be forwarded in the cool part of this house.

A.

Orchid House.—If former directions have been attended to, many a noble specimen will by this time have completed its growth, therefore take care not to over-water them, but let them dry off gradually; and towards the close of the month lower the temperature about 8 or 10 degrees. Watch well the requirements of everything that is still growing, and keep them in the warmest part of the house.

Stove.—In looking over Gloxinias and Gesneras, it will be observed that many of them have started into growth; and where this is strong, short-jointed, and healthy, it must be encouraged by placing the plants in strong light and close to the glass: keep them tolerably dry. Let winter arrangement be no more neglected in this department, for it is palpably absurd to let anything growing in a pot remain more than a week or two in the same place. Attend to all plants intended for winter decoration in this house, by tying them neatly; and let all be clean. and in its right place.

J. G.

GREENHOUSE HARD-WOODED PLANTS.

Supposing everything to be now in perfect order for the coming winter, a little time may be very profitably employed by visiting other plant-growing establishments to see how things are going on, and compare their system of management with your own. Much valuable information is often to be obtained in this way. The present is also a good season to make additions to your stock, as it saves time in spring. Many of the Correas, and other winter-flowering plants, will now be getting forward in bloom, and they well repay any little extra attention bestowed on them in summer. The old Myoporum album is a very pretty plant to associate with the Correas; and a well-grown plant of Acacia platyptera is a fine thing at this dull season. The different species of Leschenaultias are liable to much injury from damp, be careful to set them in a light and dry part of the house, but secure them from cold currents of air. During this month fires should be lighted occasionally early in the morning, to dry up the damp; but be cautious not to use fire at night, unless the severity of the frost renders it necessary. Should you have to keep any plants in pits, see that the walls are well banked up with turf, or otherwise protected, for after the first of this month we must look out for frosty weather.

Azaleas.—These will now be apparently resting; but although the tops are making no progress, the roots are still at work, it is, therefore, necessary to attend strictly to watering. Take care they never suffer for the want of it, for should they become dry at this season, the blooms will be poor and small in spring.

Camellias.—Here some of the early plants should be coming fast into bloom. Be very careful in applying fire-heat, which often causes the buds to drop off; and, above all things, see that the plants are liberally supplied with water. Any dust or other dirt that may collect on the foliage, may be washed off with the syringe or sponge some fine morning, taking care to have a little fire going to dry up the superfluous moisture.

Routine.—Look to the wire trellises (not in use) and have them properly repaired and painted. See that you have a good stock of green painted sticks of various sizes. Repair shades before stowing them away for the winter, so that when spring comes round you may have them in readiness. If not already done, get a good stock of soil of various kinds under cover. J. F.

Heathery.—The specimen plants are all arranged by this time; and, if former directions have been attended to, but little remains to be done to them, except to supply them when necessary with water, to guard against mildew, to ventilate the house freely at all times, and to protect them from severe frost. We say severe frost because, though it is best avoided, a few degrees of frost will do the plants less injury than being coddled up with too much heat. Water at this season must be administered with a sparing hand, but the plants must never know the want of it. When they require it, give them a good soaking and have done with it; water injudiciously used at this season is the worst enemy to successful Heath cultivation. Young stock in frames must be attended to, observing the same rules, and be prepared with covering, in case of severe weather. Avoid crowding the plants, and keep a dry and healthy atmosphere.

W. P. A.

GREENHOUSE SOFT-WOODED PLANTS.

Pelargoniums.—These will now require particular attention, care must be taken to remove all superfluous branches and decaying leaves; look closely for worms, which do much mischief if allowed to remain in the pots. A good watering with lime-water will remove them, and be beneficial to the plants. Shift such as require it into larger pots, taking care that the roots are to the outsides of the pots, and to drain them properly with broken potsherds and charcoal. All those which are required for forcing and early flowering, should now have a final shift into a good rich compost. Tie out and keep as thin as possible, to admit the air freely; keep them close to the glass to prevent their drawing. Look closely for green-fly, and fumigate whenever it makes its appearance; in fact, the better way is to prevent it by timely fumigation. Stir the surface and top-dress all such as are not shifted. Some of the late flowering varieties may yet be cut down, and the cuttings put in and kept in store pots through the winter, for late purposes next season. Take great care in watering, and see that no plants are watered but those actually in want of it. The morning is the best time to water at this season of the year. Give all the air possible every favourable opportunity, avoiding all cold draughts which are very injurious. The fancy varieties require to be kept a little closer than the strong growing kinds, to draw out their wood more freely at this season. When shifted they should be potted high, leaving the collar of the plants clear of the soil, to prevent their damping off. Light a little fire occasionally to drive out the damps, and let the sashes be open at the same time. See that the flues and hot water apparatus are in condition that they may be ready for any emergency.

Calceolarias.—Where a quantity of these are required, the herbaceous varieties may now be divided and potted into separate pots, in good turfy loam, leaf-mould, and silver sand; put in cuttings of the shrubby kinds, and pot off from the store pots such seedlings as are large enough. Prick off small seedlings into store pots to stand the winter. Sow seeds for a succession of bloom later in the season; keep the surface stirred occasionally, and fumigate to prevent the green-fly. Some of the more tender kinds should be started in a gentle heat, be very careful in watering, for on this much of your success depends.

Cinerarias.—Give these every encouragement to promote free growth, for on this the head of flower will much depend. Look carefully for green-fly and mildew. Should the latter appear, dust immediately with flowers of sulphur those leaves affected with it. Give all the air possible, and do not expose them too much to a damp atmosphere. A cold pit or frame, well protected from the frost, will answer well for their cultivation. Be careful to remove all decaying leaves as they appear. Pot off from the store pots such seedlings as are large enough, using a good rich compost for that purpose.

Chrysanthemums.—Continue to give all those in a backward state liquid manure two or three times a week, to help them to swell their flower buds. Give all the air possible in fine weather; support with sticks to prevent accident from wind and other causes, and dust with sulphur those affected with mildew.

Routine.—Turn over occasionally in dry weather the heaps of compost and manure, that they may sweeten before being housed for potting purposes; when dry enough house some for present purposes. Put in Fuchsias and such plants under the stage, where they may remain until you want to start them in the spring. Take every opportunity to wash pots, that they may be ready when wanted.

H. R.

FLOWER-GARDEN.—OUT-DOOR DEPARTMENT.

THOSE who may have looked with an intelligent eye at the masses of different coloured flowers which prevailed in flower-gardens during the summer and autumn months, must have observed that, in proportion as the colours were warm or cold, that is scarlets or purples, so was the distance apparently diminished or increased, which really separated the masses from one another. Warm colours, like light, irradiate the atmosphere to a greater distance, with their own peculiar hues, than cold colours. Indeed, it may be said of such colours, as those of the Verbena, called Hamlet, and Campanula carpatica, that subdued light is the condition in which they are seen to the greatest advantage, since they become really beautiful, as the sun is about passing the horizon. If impressions like these have engaged the attention, the individual will have formed a scale in his own mind, by which masses of colour, and their relative distances from one another, can be measured, in the absence of material objects, simply by recalling images from the past. At the present season, and for a long time to come, there is little to interest one in the flower-garden, but outlines and marked angularity, which always imperfectly fill up the view; still something may be done by us to make even those outlines and that angularity more interesting than they would otherwise be, if the knowledge we possess of the distribution of colour is made subservient to the beautifying of outlines, instead of the whole surfaces of beds, as is the case in summer planting. The Erythronium Dens canis, Allium Moly, Anemone apennina, Sanguinaria canadensis, Scilla italica, Phlox verna, and a vast number of other hardy plants, familiar enough to most persons, could be made useful for the arrangement indicated. Enriching flower-beds with manure or fresh loam, should be proceeded with, to have the soil turned up before the frost sets in; beds on grass should have their outlines sufficiently mowed by the edging-iron, to keep the form correct, but no more. All flower-garden plants standing in pits, whether in boxes or pots, or even planted out, should be exposed to sun and air on every favourable occasion, so as to harden their tissues, and continue stopping back all plants like Verbenas while the growing season lasts. Never mind the stubby appearance it gives the plants, they will be all the better for it, and be much easier put to rest when the time for it comes. Next in importance, to ripening or hardening the tissues of plants, is that of resting them. Verbenas, like Tweediana, John Salter, Duke of Cornwall, Barkerii, Emperor of China, Cardinal, and Emperor of Scarlets, may be kept in cold pits, planted out in sandy peat, or in store pots, if the frost is excluded, and the pits rendered dry by ventilation. The blotched sorts are pretty enough things in their way, but hold fast to some of the old tried sorts. Occasionally dust some slacked lime amongst shrubby Calceolarias in store boxes, and even Verbenas removed somewhat from the glass will be the better of a like dusting over the soil. When old plants of the dwarf Lobelias have been potted up and cut back, a little silver sand thrown amongst the shoots will induce them to root into it; Œnothera prostrata in the same way. Place Lophospermums, Maurandyas, and Tropæolums in a dry and airy part of the greenhouse or pits. Raise the back of all moveable frames as high as can be conveniently done, to admit all the light possible, and at the same time throw off the wet rapidly. Protecting material should be of an open and loose texture, and keep it as dry as you can; have plenty of it always at hand, as you never know what a day may bring forth. The less fire-heat greenhouse plants get during the dull days of winter the better; rather cover the greenhouse and save the fuel.

J. C.

Rose Garden.—The principal business to be done this month is the transplanting of any that may require it, buying new ones, &c. Presuming the ground to be prepared as previously directed, get the planting done as early in the month as the weather will permit. Should the weather be dry, as was the case in 1849, give each plant a good watering before the earth is all filled in, they will then get rooted before the winter commences, and will flower nearly as well next summer as though they had not been moved. As soon as any standards, half-standards, or, indeed, any that are high enough to be liable to be blown about, are planted, a straight, neat stake should be placed to each plant, securing them firmly to it, to prevent their being blown about, which is very injurious to them.

This is also the best month to collect and plant stocks for next season's working: in the selection of them choose the true Dog-rose, rejecting such as have an affinity to the Sweet Brier, which may be known by the bark being thickly covered, particularly near the bottom of the stem, with small and larger thorns of a whitish colour; and also those that have a climbing habit, which latter may be known by the dark green colour of the bark, and a few short thorns, and an appearance of weakness in the stem, as Roses seldom make good plants if worked on either of these stocks, and live but a short time. Prune the roots close to the stems, and any shoots there may be on the stem must be cut off close, so that they may be quite straight. When the planting is finished, cut the tops down to within four or six inches of the height they are wanted; make the surface of the ground even, by stirring it with spud, and leave them till spring.

Roses in pots, intended for forcing this season, should now be protected from heavy rains; and, towards the middle and end of the month, some should be pruned and set in a cold pit, where they may be protected from frost, but can have plenty of air in favourable weather. The following are a few select new Roses well worthy of being added to any collection:—

HYBRID PERPETUAL:—

Baronne Hallez, light carmine.
Berranger, rosy-purplish crimson.
Caroline de Sansal, flesh colour.
Chereau, cherry rose.
Comte de Montalivet, dark red, tinted violet.
Comte de Bobrinsky, cherry red.
Duchesse de Montpensier, rosy blush.
General Cavaignac, cherry carmine.
General Negrier, delicate rose or rosy blush.
Gigantesque, deep rosy crimson.
Joan of Arc, nearly white.
Léonore d'Este, blush with paler edges.
Madame Clavel, purplish carmine.
Madame Campell d'Isly, rosy lilac, marble, carmine.
Madame Lamoriciére, transparent rosy pink.
Madame Pepin, delicate pink.
Madame Guillot, deep pink.
Pius the Ninth, purplish red.
Reine des Fleurs, pink, shaded lilac.
Standard of Marengo, warm crimson.
Cymedor, crimson.

The two last are only good in cool weather.

DAMASK PERPETUAL:—

Anne de Bretagne, rosy red.
Celina Dubos, French white, habit of Rose du Roi.
Josephine Robert, bright rose.

ISLE DE BOURBON:—

Aramis, rosy red.
Aurora, violet crimson.
Deuil de l'Archevêque de Paris, reddish purple.

TEA SCENTED:—

Madame de St. Joseph, salmonish pink.
Madame Mélanie Villermoz, white, fawn centre.

There is also a new perpetual Moss Rose, Herman Kegel, which I have not flowered yet. I hope it will be a very great improvement on the rubbish hitherto sold under this tempting title.

H. M'M.

Arboretum.—In this department it is only necessary to observe that the operations of planting must be prosecuted with activity, as long as the weather continues sufficiently open. If it can be done, it ought to be a general rule to get over this kind of work as early in the autumn as possible; but where there is much on hand, it is often unavoidably necessary to carry it on until stopped by the frost, but every nerve should be strained to prevent any being left until the spring work comes on; because at that season there is always so much on hand, that something must suffer if the planting (which, in places where no extra hands are brought in for the purpose, may truly be called extra work) is delayed until that time. Remember to see that trees of all sizes are firmly secured in their positions at the time of planting, for without this care all other labours are useless, as it is impossible for a tree to strike root and fix itself, if it is not firmly retained in position.

Shrubbery.—The formation and planting of shrubberies should also be vigorously carried on, and brought to a close for the above reasons. Also the thinning-out and re-arranging of old and overgrown shrubberies should be looked to as leisure serves; where these are very much overgrown, the thinning should be conducted gradually, that is, a portion should be quite headed down every season, until the whole is renovated with young foliage; and this should afterwards be kept properly cut-in, to preserve it in a state of luxuriance; indeed, it may be considered that attention to heading-down the commoner kinds of evergreen and deciduous shrubs is one of the surest marks of good management, and it ought to be extended over the whole place, as nothing looks worse, or indicates negligence so much, as a mass of rambling overgrown shrubs, with immense heads and a confused array of naked ugly stems.

In resuming my list of desirable shrubs, I cannot help noticing the Aralia japonica, a splendid shrub introduced from Japan, in 1838; its immensely decompound foliage is very fine, and it is an abundant flowerer. A specimen before me has at this time a dozen expanded clusters of bloom of a greenish white colour, which have a highly ornamental effect, each cluster being composed of several spikes of bloom, about eighteen inches long, diverging from a common centre, and taking the form of a crown. It requires a sheltered situation, and should have a place in every garden. I shall now proceed to notice a few of the best Spiræas which, in their season of flowering, are amongst the most ornamental of our flowering shrubs, and deserve attention.

Spiræa Douglasii.—A native of Columbia, a shrub of good habit and free growth, producing an abundance of dense spikes of bloom of a deep rose colour.

S. prunifolia flore pleno (China).—A rather rambling species, but very beautiful when in bloom; is well adapted for growing amongst large masses of rock.

S. Lindleyana (Himalayas).—Both foliage and flowers of this species are fine and distinct, but the habit is not good, as the tips of the shoots are generally killed by the frost. It should not be planted prominently forward, as the spikes of bloom are generally six or seven feet from the ground; therefore, if planted behind some dwarfer shrubs, the really beautiful long spikes of bloom will bend gracefully over them, and meet with many admirers.

S. Reevesiana (China).—At present this species has not shown itself an abundant bloomer, but the foliage is distinct, and the habit tolerable. In places where it will bloom well, it will be a desirable addition.

S. bella (Nepaul).—A pretty species, with small corymbs of pink flowers, and a rather dwarf habit.

S. Ariæfolia (North America).—This species, when in flower, is one of the most showy of the genus. The habit is good, and the dense spikes of white flowers are produced in great abundance.

Spiræa nutans.—Under this name I possess a variety in every way desirable. It is of a more compact habit than most others, and produces a great abundance of clusters of white flowers. The above are amongst the best of the shrubby portion of the genus. Most of them are inclined to ramble, and will require a liberal use of the knife to keep them compact. J. C. R.

Auriculas—being now in their winter quarters require but little else than attention being paid to air, and the pots occasionally examined to see no worms are at work at the roots, which may easily be discovered by the casts thrown upon the surface of the soil. On fine days the lights should be quite off.

Carnations and Picotees.—Layers of these should all be potted off by this time, and placed in their winter habitation; regarding more especially security from dampness, but by no means cover them when the state of the weather will allow of their being fully exposed.

Dahlias.—With the exception of the havoc the late winds have made, these autumnal beauties are yet fresh and gay. It would, therefore, be premature to advise their being taken up, more especially if the precaution given last month has been attended to; but when the Ice King shall have taken the last chance of freshness to his shade, no time should be lost in taking them up, securing the names by means of labels securely fastened by leaden (or some such) wire, and stowed away, stalks downwards, in the place most convenient and secure from damp and frost. Some seedlings that have bloomed late, and the plants yet weak, would be benefited by being potted and kept dry for the winter.

Hollyhocks—may now be cut down and propagated by cuttings from the old stools, as also by eyes from the flowering stems, but by no means should they be forced by too much warmth to accomplish this end.

Pansies.—A stock of these should now be potted off to reserve in cold frames, for the purpose of filling up vacancies, or making new beds, in the early spring. Those in beds examine to see that they are not disturbed by worms or the action of the wind. Seedlings not planted, had better be deferred till spring.

Pinks.—Those planted last month, from the favourable state of the weather, are looking as healthy as the most ardent cultivator can desire; and will only require an occasional glance to see that the winds do not loosen them. Where such is the case a small peg or stick may be used to keep them secure. See also that the labels are correct.

Polyanthuses—in beds would be greatly benefited if the surface soil was stirred, and a top dressing applied, consisting of equal parts maiden loam, leaf mould, and well decomposed cow manure. Attend to the seedlings and see they are secure, as they are apt to become loosened at the bottom, when they should be secured by a gentle pressure.

Tulips.—Lose no time in planting what bulbs of these yet remain out—regarding more especially the state of the soil—as it is very injurious to them to plant in soil that is very wet; and as a greater chance of their well doing, the beds should be hooped over and matted in the event of much wet. T. B.

FRUIT-GARDEN.—IN-DOOR DEPARTMENT.

Fruiting Pines.—The plants for next year's fruiting will now be at rest. Keep the air of the house dry, and allow them plenty of ventilation. Less water should now be given, and use all the means you can to mature the growth made by the plants during the summer months. Attend to the plants now showing fruit, by keeping up a rather higher temperature, to assist them to bloom freely. Fruit now swelling should have the requisite waterings, with a moister atmosphere; the bottom heat should now be made up to last through the winter months.

Succession Plants.—Little will be required here beyond attention to the bottom heat and linings. In whatever way they are grown, the moisture of the air must be gradually reduced. Give air at all opportunities, and make your plants, by a liberal allowance of air and drier top heat, in a condition to pass through the dark months of winter with safety.

Vineries.—The advice in our last calendar respecting the management of late vineries, will be quite applicable for this month. In addition, we would strongly recommend some protection to preserve the borders from heavy rain and snow through the winter; we employ a coating of rough mortar and fine gravel, spread on with a spade, and beat firm; such may be removed next March. Other materials will suggest themselves, as felt or tarpauling.

Early Vinery.—If this house was started last month, considerable care will be required in keeping a temperature sufficiently regular to enable the Vines to break freely. For this purpose, if you have a body of fermenting dung inside the house, turn it over each morning; and, by timely additions, sufficient steam will be generated to preserve the atmosphere in a genial state. If such plan is not convenient, or practicable, the troughs over the pipes or flues must be kept filled, and the house syringed frequently to obtain the requisite humidity. The night temperature should not exceed fifty degrees, till each bud is fully swelled, when it may be gradually raised to fifty-five. An increase in sunny days may be allowed of twenty to twenty-five degrees; and, by fire heat, ten to fifteen above the night temperature. Be particular in keeping the outside border in a moderately warm state; for this purpose watch the fermenting materials. If leaves are principally used, it is a good plan to protect them by a coat of thatch.

Vines in Pots.—Remove out of the houses, protect the roots, and tie up the stems to stakes, or place them where the canes can be secured from being broken. If pots are intended to be forced for the earliest crop, time may be saved in breaking them by plunging the pots in a dung pit, and applying a lining of dung. When the buds begin to swell remove them to the fruiting house.

Routine.—Where it is intended to make new borders next spring, materials should now be collected for the purpose. Save all odd wood, &c., to enable you to get a good heap of charred material during the winter.

J. S.

Figs.—These must on no consideration be exposed to frost, nor even to a temperature below thirty-five degrees; for it is of the very utmost importance to keep the embryo Figs from injury; as, if these be hurt by frost, or otherwise, we lose the first crop of fruit next season. Where grown in a house by themselves, the lights must not be taken off, but give them plenty of air when the weather permits. Plants that are grown in pots, or tubs, are very easily managed, as they can be removed to a sheltered shed, or barn, where they can be kept safe from frost, until wanted to force. They should now receive their winter dressing, by removing all dead leaves, old ligatures, and everything likely to harbour insects. They should also receive a dressing of the following mixture:—a little soft soap, sulphur, clay, and tobacco-water, reduced, with water, to about the consistency of paint; this is to be applied with a brush.

Peaches.—These trees should be exposed as much as possible to the atmosphere, unless frosty, or cold weather prevails. Whilst the trees are untied, they should be carefully washed with the composition recommended above for Figs, which should be applied in a milk-warm state, with a painters' brush. As soon as the composition becomes dry, the trees should be neatly and carefully tied to the trellis work. The inside borders should then be lightly stirred with a fork, merely to open the surface; they should then receive a good dressing of horse-droppings, and the outside borders may, at the same time, have a good mulching. Those who wish to have ripe fruit by the first of May next, should commence forcing not later than the middle of this month. We are aware that it can be accomplished in less time, but at what a sacrifice to the trees! All early forced Peaches should not have less than five months allowed, from the commencement of forcing to the ripening of the fruit, and they will do much better if they have more time given them, as success, in a great measure, depends upon the organs of fructification being allowed sufficient time to unfold themselves gradually. The inside borders should receive a thorough good watering of liquid manure; they will not then require any more until the leaves begin to develope. If the weather be mild, fires will not be required for a few days. The night temperature for the first month should not exceed forty degrees, the trees should be syringed two or three times a day, and a moist atmosphere should also be maintained.

Strawberries.—If our previous directions have been attended to, these will now be good plants, with well formed, strong crowns, and able to do good work next season. As they will have done growing, they should be put into winter quarters, placing a sufficient number for the first batch of forcing plants, into a cold frame, pit, vinery, or peach-house. The following, which is my plan of storing, I have always found to answer admirably well:—In the first place, I mark out with a line, a piece of ground, ten yards long by thirty inches broad, and then lay a row of pots down each side, the plants outwards, and the bottoms of the pots towards each other; the space between the two rows of pots is then filled with old tan, or sand, or coal-ashes; or, in the absence of these, with the garden soil, raising it a little above the level of the pots; I then lay two more rows of pots above the other two, keeping them, also, at the same time, within the rims of the bottom row; the space between the pots is filled as before. I proceed in this manner until I get six rows of pots on each side, it then presents the appearance of a ridge, when the top is thatched, so as to throw the water entirely off the plants; by this means the roots are kept as healthy as possible. In frosty weather, hurdles are placed in front of the plants, over which litter is thrown. I generally choose a place as much out of sight as possible, in order that the litter and covering may not be much seen. M. S.

Cucumber House.—If previous directions have been attended to, the plants will now be in a forward state; they must be kept thin of wood, by removing the alternate laterals, so that they enjoy every ray of light in every part of the house. If there is any appearance of mildew, the bottom heat must be examined, and by keeping it at 85 degrees, and the atmosphere at 70 by day, the mildew will soon disappear. See that every part of the house is carefully sprinkled with tepid water, once or twice every day, so long as the external atmosphere continues so dry. Where the plants are in a forward bearing state they must be judiciously managed, so as not to overcrop them, as they are liable, under such circumstances, to get into a sickly state. Pay timely attention to fumigating with tobacco, on the first appearance of green-fly; and if thrip attacks them, apply the syringe freely to the under side of the foliage. Give air freely in the early part of the day, and shut up early in the afternoon.

Dung Bed.—In this department there can be more valuable labour bestowed in this month than is generally imagined, by collecting every particle of manure, dry or wet, and mixing it in large heaps. It will be found profitable in dull dark mornings to employ some of the labourers to turn over the dung, and well mix it together, by these means there will not be any harbour for woodlice or other vermin, which annoy gardeners so much. If the materials are kept in order as above, there will not be any need of the many traps for slugs, woodlice, &c., that are recommended by experienced gardeners; and the frame ground will present a more agreeable aspect than is generally the case. Where plants are already up they must be kept close to the glass, and the glass quite clean. The linings must be kept well topped up, and if the heat is strong, air must be admitted by night, to prevent them drawing up. W. T.

FRUIT-GARDEN.—OUT-DOOR DEPARTMENT.

Peach, Nectarine, and Apricot.—Commence pruning immediately the leaves are fallen from the trees. It is a very general practice to prune these trees in the spring. The reasons given for so doing are various; some gardeners assert that it is that the blossom buds may be distinguished from the wood buds; but as they may now be clearly detected by an observant eye, this reason will not hold good. Others state that the young shoots would die back if pruned before winter; but this will not take place if the trees are in good health. Another objection to autumn pruning is, that it causes luxuriant trees to grow still more luxuriantly; that if they are not pruned until late in the spring, when the sap of the tree is in action, it tends to weaken it. This is a poor reason for spring pruning, even if it had a partial effect in checking over luxuriance, as root pruning would effectually remedy that. There appears to be but one valid reason for spring pruning—it delays the expansion of the flowers; but this may be prevented by covering the trees during the warm sunny days of March. As the autumn is undoubtedly the best time for pruning deciduous trees and shrubs, I do not see that these trees should be an exception. Finish planting as early as possible. Fasten the branches loosely to the wall so as to allow the tree to sink with the soil.

Apples and Pears.—Get in the late sorts of fruit immediately. Examine that in the fruit room, and separate the best from the inferior, at the same time picking out every fruit that is in the least decayed. Prune those against walls, and also espaliers; the dwarf and standard trees in the orchard may be pruned when favourable opportunities occur. Continue to plant during the month, but complete this operation if possible within that time. Secure to stakes newly planted trees, and lay some short litter over the roots.

Plum and Cherry.—The fruit of late sorts of the former should be gathered before frost sets in, and either wrapped in paper, or hung up by the stalk in the fruit-room. Pruning and planting should now be proceeded with. I have observed that in many situations not particularly favourable to fruit trees, the Morello Cherry has been very bare of young shoots in the centre of the tree; when this is the case, I would recommend the foreright shoots to be laid in. This advice may appear strange to some persons, but having adopted it myself with great advantage, I would strongly recommend it.* They may be cut out afterwards as opportunities offer. I do not see why a tree should be injured by pruning, merely to give it an artistical appearance. The branches of fruit trees may be strained, twisted, and pruned with impunity in some soils and situations, but not so in others.

Fig. -In the northern part of England, it may be necessary to protect them on the approach of frost, but I believe it is frequently done to an injurious extent. It is not often I have seen them injured by frost, but I have seen them injured by the means employed to protect them.

Gooseberry and Currant.- Plant and prune while the weather is favourable. In pruning the former fruit shrub, it must be taken into consideration whether quantity or size of fruit is required. For a gentleman's establishment quantity is generally required, fruit of a large size rarely. For the production of the former, much more wood must be left in the trees than for the latter purpose. If the trees are young, and wood is required, shorten the young shoots one-half or two-thirds; if the trees are of full growth, only just take off the point of the young shoots, and when the branches are pendant, take care to cut to a bud on the upper side of the shoots. When the trees are pruned lime the ground, and manure it if it is required, and then slightly dig it.

Strawberry. -In continuation of my remarks of last month, I have recently been made acquainted with a gentleman who takes up his old plants in spits every year, and re-plants them again immediately in the same ground. My informant states that he has enormous crops of fine fruit by adopting this treatment.

H. C. O.

KITCHEN GARDEN.

Carrots, Parsnips, and Red Beet, will by this time have completed their growth, and preparations for storing them should now be made. Cauliflowers, and Cape Brocoli must be watched, and their outer leaves bent over the heart of the plant to guard it against the injuries occasioned by frosts, until they are large enough to store away in cold pits, frames, or other contrivances where protection can be afforded. Endive and Lettuce should also receive similar attention, and a succession tied up and blanched weekly, to render the supply adequate to the demand. Earth up Celery whenever the plants have attained sufficient size; prepare some long litter or fern so as to be enabled to afford the necessary protection at the shortest notice against the destructive influence of its greatest enemy, severe frosts.

Earth up Cabbage plants, the tall kinds of Brocoli; stir the soil and free from weeds the crops of Spinach. Plant out a quantity of Cabbage plants, rather thickly, for drawing out whilst young. Remove all old crops, manure, rough dig, or trench up all vacant quarters, in order to prepare more effectually the land for successional ones. Sow small salading in boxes weekly, and place them in heat to ensure an unceasing supply.

Cover, towards the end of the month, a patch of Sea Kale with leaves, not more than about *a foot in thickness*, for very little excitement, at this season, is productive of diminutive footstalks, instead of *plump, compact* ones, such as are fit to send to table. Rhubarb may be treated in the same manner, or a few crowns taken up, and placed in the Mushroom house, will answer equally well. Continue to make up fresh beds for Mushrooms, observing that they are not too wet.

Roll walks, rake up leaves, and forward any alterations that may be deemed necessary. J. C. S.

WILD FLOWERS FOR NOVEMBER.

Our title appears rather unseasonable this month, and we shall find little to employ our attention among Wildflowers, unless we have dried and preserved some of those which have rewarded our summer rambles. To do this, to form a *hortus siccus*, or collection of dried specimens, is very desirable, when the object is to become thoroughly acquainted with the flora, even of our own country alone; when we extend our studies further, dried plants are of course indispensable.

The value of a collection of specimens in the former case, arises from our being enabled to compare the kinds one with another, and thus to acquire a knowledge of their relationships; for instance, it is not often possible to obtain all the species of a genus at once, in a fresh state, much less all the genera of an order. Moreover, local collections are the surest data on which to found the generalizations of the geographical distribution of plants, a subject of daily increasing interest. With regard to the formation of an herbarium, the drying and preservation of the plants is a very simple process, and is explained in most elementary works on Botany, we therefore shall not enter upon it, especially at this time of the year; but next month we intend to offer a few remarks on the formation of *local collections*. A. H.

ANIMAL KINGDOM.

Ornithology.—November—the word has a dismal sound, dark and dreary days, accompanied with thick and choking fogs, are generally associated with it; but it is not always so, a few bright days will rise from amidst the gloom, making the woods look gay, even in their nakedness, when a ramble through them will not be devoid of interest. There is now at times a deathlike stillness about them, no rustling of foliage, no hum of the insect world—all is hushed, they have passed away like a vision. How swiftly time has flown by since we hailed with delight the bursting buds; with what increased interest we watched their rapid growth; we saw them in their prime, when they danced gaily in the summer breeze, affording food and shelter to thousands of the insect world; we admired them in their rich autumn dress; and now they rustle at our feet

"Withered and strewn,"

soon to commingle with that earth from which they sprung. Man may trace his own passage through life in the history of a leaf.

To the real lover of nature, the woods, even at this season, have charms: there is music in the winter blast as it moans amongst the bare branches, making them creak and groan as they rub and jostle each other; then, their fantastic shapes, some twisted like huge snakes, some shooting out to the right, some to the left, some towering aloft far above their companions, no stiffness in their forms, they grow in their native freedom, the pruning-knife has nought to do with them. Trees are always full of interest, they form the principle home of the feathered tribes; in them they rear their young, from them they obtain a great portion of their food, and amongst their branches a large number pass the night, so that they are intimately connected with the study of birds, and who can fail to admire them? Look at yon sturdy Oak with its massive trunk and powerful arms, from which spring innumerable smaller branches; what a world of life is contained in that giant tree, what myriads of the insect tribe have sported round it in the summer sun; 't is here the Turtle wooed his mate; from amidst its thick foliage the Cuckoo piped his notes of joy; the Woodpecker has twined about its massive limbs prying for some sign of decay, but still found him hale and hearty; and yet this giant tree has stood the scorching of the summer sun, and the raging of the winter blast, for upwards of a century. But mark how lowly its origin: from a little acorn similar to that which we now hold in our palm, arose that glorious tree; and who can look upon such a sight unmoved, the mind instinctively wanders from the little acorn to the mighty tree, and from that mighty tree, in silent adoration, up to God.

There is little change to be observed amongst our birds, the Fieldfares and Redwings, if the weather still be open, may be seen scattered over the meadow lands; the Larks, Buntings, Linnets, and other small birds are in flocks, and may be found wherever food is plentiful; we hear, however, but little of them, their short call notes are the only sounds they utter, even our little pet, the Robin, is now almost mute, and comes close to the cottage door, with wings all drooping and feathers all puffed out as if in sore distress, a humble petitioner for a few crumbs. Let us hope he never petitions in vain.

To those that dwell by the sea-side this is a season of interest, immense flocks of wild fowl come pouring in from their summer haunts in the north, spreading themselves along the shore and ascending all the smaller creeks, they afford great sport to the gunners. The Curlews (*Numenius arquata*), Wimbrels (*Numenius phæopus*), Dunlings (*Tringa variabilis*), and others of the Tringa tribe, may be seen in large number, and add greatly to the interest of the scene, their low wailing notes blending in melancholy cadence with the moaning of the ocean's waves; 't is a grand sight to witness the immense flocks of birds of various species, that are constantly passing and repassing, each with their peculiar mode of flight, all receiving sustenance from that world of waters; how the eye longs to penetrate those unfathomable depths; what mighty secrets may not be still there hid from the prying eye of man. H. W.

Entomology.—The out-door entomologist cannot now effect many acquisitions to his cabinet from the insects to be met with at large in this dreary month. Still, however, the gay flowers of the Chrysanthemum, and the still more attractive flowers of the Ivy, swarm with Hymenoptera and Diptera on sunny days, and when they disappear from our view, it is most probable, as old Gilbert White remarked, that they retire under the shelter of the broad leaves of the ivy, or conceal themselves between its fibres, and the tree round which it entwines. It is surprising, that notwithstanding the partiality which so many insects show to the flowers of this epiphtic plant, how few feed upon it in the larva state. We do not, indeed, recollect a single species of Caterpillar which devours its leaves, and only a single small Beetle (*Ochina hederæ*), the larva of which burrows in its stem. A few Moths of small size, peculiar to this and the following months, may also now be found, such as the November Moth, Geometra (*Oporabia*) dilutata; the November Dugger, Tinea (*Diurnea*) Novembris; the Drab day Moth, Tinea (*Cheimophila*) Phryganella, &c.

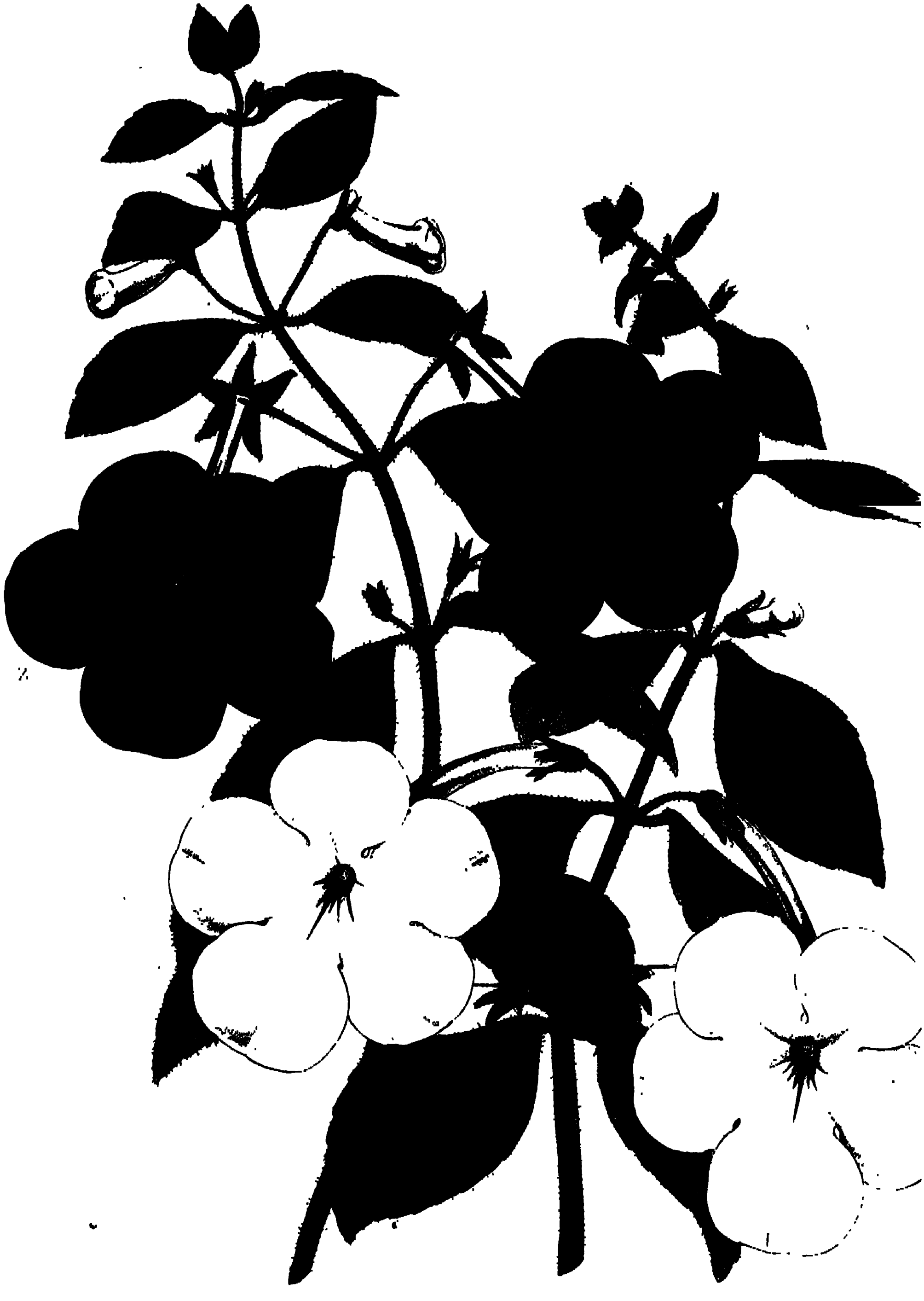
One of these small Moths, the winter Moth, Geometra (*Hybernia*) brumaria, is, however, worthy of more particular attention than the rest. The males of this dull-coloured insect are to be observed flickering about in the evening, just at dusk, hovering about fruit-trees, hawthorn hedges, &c., their object being to search for the females, which are only furnished with very small rudiments of wings, so that they are unable to fly. This Moth proceeds from a light brown chrysalis, which lies under the surface of the ground from June to October. When hatched the female mounts the stems of the trees, and then sits quietly until pairing has taken place, when she has the instinct to ascend to the fruit and leaf buds, where she deposits her eggs, from which are hatched in the following spring a number of small green Caterpillars, which are amongst the greatest enemies of the gardener, as they not only devour the leaves, but the young fruit and blossom-buds, which they fasten together with silken threads, and so also prevent their natural growth. Various plans have been proposed for the destruction of this insect, amongst which the most efficient appears to be to surround the stem with a kind of wooden box, which is to be smeared with tar at the period when the perfect insects make their appearance, by which means great numbers of the females will be destroyed.

During the past month our gardens have been swarming with the Caterpillars of the Cabbage Butterflies, to so great an extent as entirely to destroy whole beds of Brussel's Sprouts, Savoys, early Cabbages, &c. These Caterpillars, when full grown, mount the adjoining walls, palings, &c.; and our present object in mentioning this insect is to direct attention to the little bundles of yellow silken masses which are to be observed in such situations, and which the gardener, notwithstanding his desire to have everything tidy and neat, must on no account remove or destroy. These little masses are, in fact, the cocoons of vast numbers of little Ichneumon-flies, which have lived in a parasitic state whilst larvæ, within the bodies of the Cabbage Caterpillars, bursting through the skins of the latter when they, as well as the parasites, are fully grown—an admirable instance of instinct, since if the parasitic larvæ were full grown before the Cabbage Caterpillar, the latter would not have sought out its safe retreat, where the little parasites are now secure, until the period when they assume the winged state in the following spring.

At this season of the year too much importance cannot be attached to frequently disturbing the earth beneath trees, which have, during the preceding season, been greatly infested with insect enemies, many of the Caterpillars of which descend into the earth to become pupæ. Such is the case with the Caterpillars of the Grub of the Gooseberry Sawfly, the Raspberry Grub, the Pear-leaf Miner, &c. The larvæ of some species, indeed such as that of the Cockchaffer, descend to a greater depth in the earth, to pass the winter in a quiescent state. These, therefore, cannot be so readily reached, nor would it be of so much service to disturb them, as it is to dislodge those species which do not descend so deep into the ground; and which, moreover, are in the inactive pupa state, so as not to be able to crawl back under-ground when disturbed.

It is also very serviceable at this time to remove all loose bark and pieces of decaying wood, as these harbour great quantities of insects during the winter months. This is the case with Grubs of the Codling Moth, and the red Grubs of the Plum Moth, the Caterpillars of which form their cocoons under the loose bark of fruit-trees.

The various species of scale insects ought also to be sought for and destroyed at the present time, with great care, since they will now be found either filled with eggs, or their eggs will be found deposited in masses beneath their shrivelled bodies, waiting for the returning warmth of the spring to hatch them, when myriads of young will be produced and disseminated over the trees infested by them. J. O. W.



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Achimenes longiflora

ACHIMENES LONGIFLORA, VARS.

***Nat. Order.*—GESNERACEÆ.**

GENERIC CHARACTER.—Achimenes, *P. Brown.* *Calyx*, with the tube adnate to the ovary; limb five-parted, the lobes lanceolate. *Corolla* tubular, funnel-shaped, often gibbous at the base in front; limb flat, five-toothed; lobes sub-equal, sub-rotund; *stamens* four, didynamous; *anthers* not coherent; rudiment of a fifth stamen inserted on the corolla below. *Glandular nectary* annular, thin. *Style* passing into a scarcely thickened oblique or somewhat two-lobed *stigma*. *Capsule* half two-celled, two-valved; placentas parietal, subsessile.—Erect villous American herbs. Leaves opposite or in whorls of three, stalked, toothed; pedicels axillary, one-flowered; corolla scarlet or purple, much smaller than in Gloxinia; roots (and axils) bearing scaly bulbils. —(*De Cand. Prodr.* vii., 535).

ACHIMENES LONGIFLORA, *Bentham.*—Leaves in whorls of three or four, ovate or oblong, roughly serrate, and like the stem, hirsute; pedicles one-flowered, shorter than the calyx; lobes of the calyx lanceolate, erect, one-fourth of the length of the tube of the calyx; limb of the corolla very much spreading.

Var. alba.—Jaureguia's Achimenes. Flowers white, with a delicate rose-purple eye. A. longiflora alba, *Van Houtte*; A. Jaureguia, *Warczewitz.*

Var. Tugwelliana.- Tugwell's Achimenes. Peduncles much longer than the calyx; flowers deep rich crimson-purple. A hybrid, between A longiflora and patens.

DESCRIPTION.—Herbs, perennial by filiform stolons, bearing scaly buds or bulbils. Stem erect, herbaceous, rounded, clothed with patent hairs. Leaves opposite or in whorls of three or four, between ovate and oblong, acute or somewhat acuminate, serrated, hairy, paler, and often purplish beneath. Flowers solitary, but occurring in the axils of almost all the leaves. The peduncle in A. Tugwelliana is much longer than in the type of the species, in which it equals the calyx. Calyx cut into five deep lanceolate segments. Corolla somewhat salver-shaped; tube very long and slender, curved, pale reddish; limb very large, spreading—in A. longiflora alba, white, with a delicate rose-purple line radiating from the throat: in A. Tugwelliana deep rosy violet—cut into five broad obcordate segments, the two upper somewhat smaller than the three lower. Style and stamens included.

HISTORY, &c.—Our drawing of the white variety of A. longiflora was made from a plant in the possession of Mr. Henderson, of the Wellington Road Nursery; and we have met with it blooming in several other establishments during the season. A. Tugwelliana was figured from the nursery of Mr. Glendinning, of Chiswick, by whom this showy variety was recently let out. The former is an importation from Guatemala, where it was found by M. Warczewitz, by whom the name Jaureguia was applied to it in compliment to a Guatemalan lady, who made a drawing of the plant. A. Tugwelliana, on the other hand, is an English garden variety, raised by Mr. Carmichael, gardener to G. C. Tugwell, Esq., Crowe Hall, near Bath, being a hybrid, the parents of which are A. longiflora and A. patens.

CULTURE.—The Achimenes are annual in their mode of development, forming scaly bulbils during their period of growth, these remaining inactive until excited by external influences. The routine of culture is to start them in succession during the spring, commencing as early as may be required; this may be done in a hotbed frame, or in a stove or propagating house. They are grown in light rich earth, in which the mould from decayed leaves should preponderate; and should be put either into wide shallow pots, or into shallow pans, as they do not require depth of soil. Single stems, of some of the kinds at least, may be grown into large tufted masses, but it is more usual to plant several together. In the earlier stages of their growth, they like the moderate heat of a calm mild forcing pit, but as they approach a flowering state they may be hardened off to expand their blossoms in a greenhouse, although they do so much finer in the warmer temperature of an intermediate stove. When flowering is past, they are allowed to die off gradually, and are kept during winter quite dry in any moderately warm place. For more ample details of culture, see vol. i., p. 126.

From the number of introduced species and cross-bred varieties now in cultivation, the genus Achimenes assumes an important position in reference to summer and autumn decoration; but here, as in most other cases, the genius of cultivation is beginning to eclipse even the splendid forms which have been obtained from their native land. The subjects of our plate are useful additions to the family.—M.

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THE COURSE OF THE SAP IN PLANTS.

By J. TOWERS, Esq., C.M.H.S.

WHATEVER may be the result of the arguments, *pro* and *con.* the progress of the sap, raw and elaborated, will be, in some degree, elucidated by investigating phenomena that follow the operations of budding and grafting :— A strong shoot had been produced in the spring of 1849, from the root of a Noisette Rose. By the last week of August it had grown to the height of about seven feet, and was nearly an inch in the girth at five feet from the ground,—the point where a fine bud was inserted at that period. The stock and the scion were both *very* full of juice; too much so, perhaps, in the opinion of most gardeners: the bark separated perfectly, and with ease from both; and, consequently, the union was immediately effected. The bud remained green but latent, till, by the influence of spring, it sprouted, and progressively developed seven main shoots, which required much cautious care to support them from the powerful winds of the late summer. Some of the shoots were more than thirty inches long, and have been cut back; thus furnishing many buds to others, most of which appear to have been successfully inserted. At the present date (September 1850), the results are,—a bold and pretty equal head, and a stock enlarged to 1¼ inch in the girth throughout, in which the bark below the insertion of the bud is furrowed with some brownish stripes, evidently of organized matter produced by the bud. With these faithful data before us, and knowing, as every practised observant gardener assuredly does know, that the stock below the bud, though headed down to the point of insertion, retains its own individual character, uninfluenced by the qualities or size of the head it supports, we put the question :—How, and by what instrumentality is the stock sustained and so enlarged, as we perceive it to be, in roses somewhat; but in many trees to an enormous extent?

We have been taught that each *leaf* of a tree, at least every progressive development of the head, furnishes some substance, more or less, *to* the stem. Be it so; yet we find by experience, that, be the size and increase of the head and stem what they may, the development of the latter retains precisely the character and qualities of the original *stock;* while those of the former remain faithful to their parent tree or shrub. At this point let us refer to principles :—

The success of budding mainly depends upon the preservation of what is called the *root* of the bud. This root may be traced to a certain white line or track of pithy matter that is observed to traverse the woody layers in cutting a twig or branch across at the spot whence a bud emerges. This fact, viewed connectedly with the extinction of the pith in full grown and old stems, leads to the opinion that the pith (*medulla*) is the original magazine of nutrimental matter to all buds, and that the buds contain and carry onwards the matter of the pith; the natural termination of the tree's life being coincident with the final development of the buds (the pre-organized germs of Duhamel?), and the total exhaustion of the medullary matter.

A Treatise on Vegetable Physiology by the Society for Diffusing Useful Knowledge, published many years since, contained the following philosophic remarks :—"No determinate period is fixed for the protrusion of the germ into a bud; but at whatever time this may happen, its course is traceable, from the medullary sheath to the surface on which it appears, by a pale stream of parenchymatous matter traversing each annual concentric layer. But this track only marks the advance of the vital speck or germ to the surface of each annual belt of wood, and is altogether useless so far as regards the germ, except in the belt on the surface of which it is seated, with the life of which, indeed, its own vitality is intimately connected. Destroy this, and the germ becomes extinct: augment its vital energy, and the germ is unfolded into a perfect bud and branch; but leave things as they are, and the germ will advance to the surface of the next year's belt of wood, and so on progressively."

We obtain much truth in the above theory; but not a full interpretation of the wondrous facts which are daily witnessed. The buds and shoots which frequently emerge from the stock are always true to their native character: they are amputated so soon as they are observed, and therefore cannot promote the enlargement of the stem. Yet that stem does enlarge by each annual layer of the new alburnum and liber. The head, in all its developments, is true to its kind, and all the leaves upon it are retained; the currents within it, be their course as it may, seem to be exclusively devoted to the perfecting of its own members; and yet, one would suppose that some fluids must pass into the stem, and be there distributed horizontally through the channels of the convergent medullary processes. Two important facts seem to be indisputably established: the first is, that *every bud produced in the head of a tree*, whatever the size and age, *had been preorganized and latent in its first parent germ;* the second, that *the entire stem* (its wood and bark), however bulky it may become, *is normally pure* in its character, never suffering deviation or change. What then becomes of the crude doctrine of the sap's descent from the head to the foot?

New and Rare Plants.

Moutan officinalis, salmonea, *Lindley*. Salmon-coloured Moutan (*Paxt. Fl. Gard.*, i., t. 20).—Nat. Ord., Ranunculaceæ § Helleboreæ. —Pæonia Moutan salmonea, *Lindley*.—A very fine hardy undershrub, with the large compound foliage common to the Moutans; and very large double flowers, the outer petals of which when full blown, are of a pale salmon colour, the inner having a deeper and richer tint of the same. From China: Shanghae. Introduced in 1846. Flowers in the early part of summer. Horticultural Society of London.

Cycnoches Pescatorei, *Lindley*. M. Pescatore's Cycnoches (*Paxt. Fl. Gard.*, i., 123).—Nat. Ord., Orchidaceæ § Vandeæ Catasetidæ. —Syn., Acineta glauca, *Linden*.—A fine stove epiphyte, much stronger than Acineta Humboldtii, having large pseudo-bulbs, lanceolate leathery leaves, and drooping flower stems, described as being a yard long, and bearing nearly a hundred flowers; these last about a fortnight, but for some months the long string of buds have a very curious appearance; the sepals are oblong acute, dull yellow, with a little brown inside; the petals and lip bright yellow, the former lanceolate, smaller than the sepals, the latter three-lobed and downy; the flowers are nearly two inches in diameter. From New Grenada. Introduced in 1848 by M. Linden to the gardens of Paris. Flowers in summer.

Bolbophyllum Lobbii, *Lindley*. Lobb's Bolbophyl (*Bot. Mag.*, t. 4532).—Nat. Ord., Orchidaceæ § Malaxeæ-Dendrobidæ.—A fine showy stove epiphyte, with ovate smooth green pseudo-bulbs, terminated by one oblong petiolated coriaceous leaf. The scapes, which are yellowish spotted with brown, grow from the side of the pseudo-bulbs, one from each, bearing a solitary flower. The flowers are large, the sepals deep yellow, the upper marked externally with purple spots running in lines, the lateral ones sickle-shaped, streaked and clouded with purple; the petals are smaller, streaked with purple lines; the lip cordate, ovate, acuminate, reflexed, yellow, with minute orange dots. From Java. Introduced in 1846. Flowers in spring and summer. Messrs. Veitch of Exeter.

Passiflora medusæa, *Lemaire*. Medusa Passion-flower (*Flore des Serres*, t. 528).—Nat. Ord., Passifloraceæ.—A stove climber, of slender habit, with deeply two-lobed leaves, and axillary flowers, numerously produced, and measuring about a couple of inches across; the sepals are greenish, the filaments or rays of the coronet, which is the most conspicuous part of the flower, are bright orange when they expand, and change to lilac or rose the following day; this change of colour appears to be accompanied by the disengagement of a strong fetid odour, comparable with that of the flowers of some stapelias. Origin unknown. Introduced to Belgium by M. Van Houtte before 1848. Flowers in summer?

Spathodea lævis, *Palisot de Beauvois* (*Bot. Mag.*, t. 4537).—Nat. Ord., Bignoniaceæ.—A small tropical tree, apparently flowering when of moderate size. It has soft woody stems, and large impari-pinnate leaves of four to six pairs of opposite oval acuminate, coarsely toothed leaflets; these leaves are alternate, "except those below the inflorescence, which are often alternately whorled." The flowers come in close terminal corymbose panicles; they are between bell-shaped and funnel-shaped, the tube widening upwards, the limb obscurely two-lipped, and divided into five spreading rounded lobes; the colour is white, delicately spotted and streaked with rose. From Sierra Leone. Introduced about 1846. Flowers in summer. Messrs. Lucombe, Pince, & Co. of Exeter.

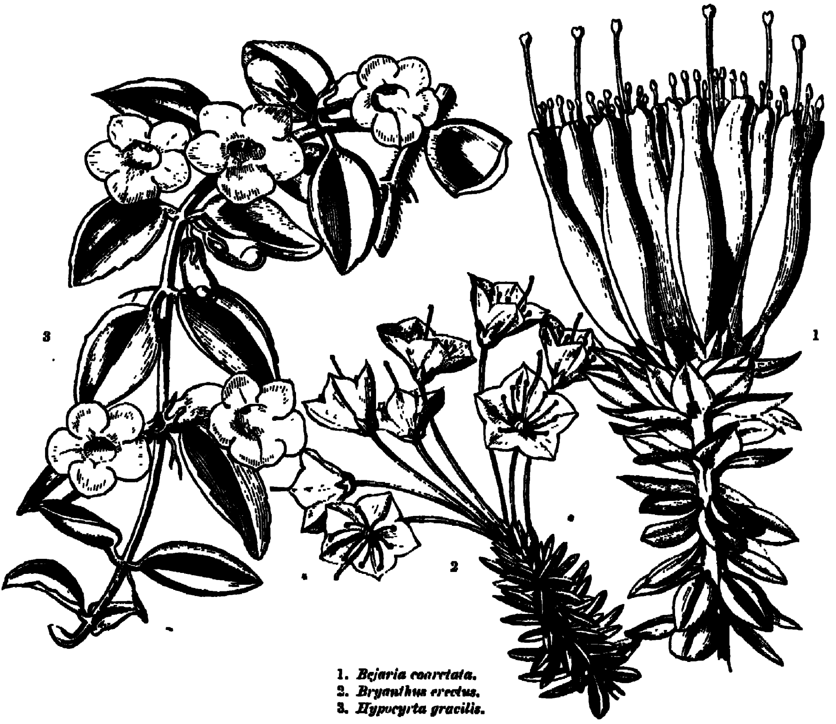
Nymphæa micrantha, *Guillemin* and *Perottet*. Small-flowered Water Lily (*Bot. Mag.*, t. 4535).—Nat. Ord., Nymphæaceæ § Nupharidæ.—A very pretty stove aquatic, the leaves of which are small - six to eight inches long - glabrous, roundish-elliptic, cut at the base into two deep much acuminated moderately-spreading lobes, in the sinus of which, at the top as it were, of the petiole, a proliferous bud is produced, which subsequently becomes a plant; the fore part of the leaves is nearly entire, the hinder part margined with shallow irregular teeth; the under surface of the leaves, as well as the petioles and scapes is tinged with red. The flowers are small, three and a half to four inches in diameter; the petals lanceolate, very acute, white or whitish; the stamens are yellow, distinct, not, as is common in these plants, insensibly passing into the petals. From Senegambia: River Gambia. Introduced about 1846. Flowers in summer. Earl of Derby.

Coccoloba macrophylla, *Desfontaines*. Large-leaved Sea-side Grape (*Bot. Mag.*, t. 4536).—Nat. Ord., Polygonaceæ § Polygoneæ.—A showy tall tree-like stove plant, with scarcely-divided erect stems, twenty to thirty feet high, leafy throughout their whole length. The leaves are alternate, a foot or more long, spreading horizontally, cordate ovate, somewhat clasping the stems, and stalkless. The stem at top is terminated by a dense compact club-shaped raceme of flowers, two or more feet long, of which the rachis, pedicels, and flowers are of the richest scarlet. These continue in great beauty for at least two months. Only suitable for a large hothouse. From South America: probably. Introduced "long" previous to 1850. Flowers in summer. Royal Botanic Garden, Kew.

Odontoglossum nævium, *Lindley*. Speckled Odontoglot (*Paxt. Fl. Gard.*, i., t. 18).—Nat. Ord., Orchidaceæ § Vandeæ-Brassidæ.—A rather pretty stove epiphyte, with ovate-ribbed pseudo bulbs, bearing thin narrowly-oblong leaves, tapering to the base. The flowers grow in narrow racemose panicles, and are of singular form, and curiously marked; the sepals and petals are long, narrow, linear, lanceolate, acuminate, and wavy. The lip is nearly of the same form, but is somewhat three-lobed, with a tendency to become hastate. The colour of the flowers is white, freely spotted with dull dark red. From New Granada: Andes. Introduced "several years since by Sir R. Schomburgk." Flowers in the spring. Messrs. Loddiges of Hackney.

Bejaria coarctata, *Humboldt* and *Bonpland*. Close-headed Bejaria (*Paxt. Fl. Gard.*, i., t. 17).—Nat. Ord., Ericaceæ § Rhododendreæ.—A beautiful half-hardy evergreen shrub, the branches of which are shaggy with spreading hairs. The leaves are oval-acute, on short stalks, closely imbricated, glaucous beneath. The flowers are in close terminal corymbs; the petals, seven or eight in number, erect, nearly parallel—that is, not spreading; the colour, deep crimson. From the Andes of New Grenada, and the mountains of Peru. Introduced about 1848 by Mr Purdie. Flowers about May. Duke of Northumberland.

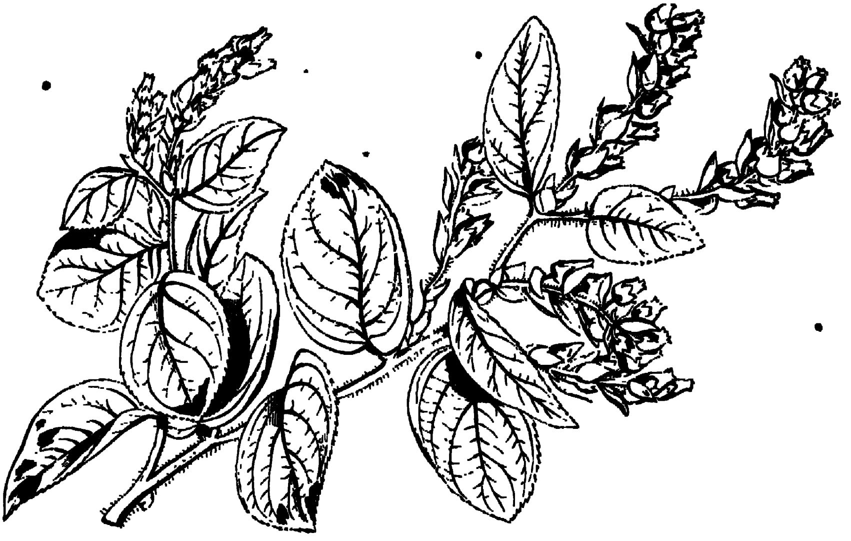
Bryanthus erectus, *Lindley*. Upright Bryanth (*Paxt. Fl. Gard.*, i., t. 19).—Nat. Ord., Ericaceæ § Ericeæ.—A charming little hardy shrub, more impatient of heat and dry air than of cold. It forms a compact dwarf bush, with erect much-branched stems, bearing linear-obtuse, obscurely-serrated leaves, and flowers, eight or ten together in corymbs from the ends of the branchlets. The flowers are campanulate, resembling miniature kalmias, of a delicate pink or flesh colour; very pretty indeed. It is said to be a hybrid between Rhodothamnus (Rhododendron) Chamæcistus, and Phyllodoce taxifolia (Menziesia cœrulea); and Dr. Lindley thinks it *may* be a cross between these plants, though he would rather refer its origin to the P. empetriformis (M. empetriformis). The north side of walls where the sun never shines, and low, but thoroughly-drained places, suit this and allied plants; better still, damp cold shaded pits in which the air remains always damp. A garden hybrid, obtained by Mr. Cunningham of Edinburgh. Raised? Flowers in spring.



1. *Bejaria coarctata.*
2. *Bryanthus erectus.*
3. *Hypocyrta gracilis.*

Hypocyrta gracilis, *Martius*. Slender Hypocyrta (*Bot. Mag.*, t. 4531).—Nat. Ord., Gesneraceæ § Gesnereæ.—A pretty creeping stove plant, with branches purplish brown stems, rooting from below the insertion of the leaves. The leaves are opposite an inch long, thick, fleshy, ovate, on short petioles; dark green above, paler and often blotched with red beneath. The flowers grow singly or in pairs, on short red peduncles, from the axils; the corolla is rather large, between funnel-shaped and bell-shaped, with a curved tube; creamy white, spotted with orange on the underside of the tube within; the limb consisting of five, nearly equal, rounded segments. According to Dr. Lindley, this is probably an Alloplectus. From the Organ Mountains of Brazil. Introduced before 1850. Flowers in spring. Messrs. Backhouse of York.

GAULTHERIA BRACTEATA, *G. Don.* Bracteated Gaultheria (*Bot. Mag.*, t. 4461).—Nat. Ord., Ericaceæ § Ericeæ.—Syn., G. erecta, *Ventenat;* G. odorata, cordifolia, and rigida, *Humboldt*, *Bonpland*, and *Kunth;* Andromeda bracteata, *Cavanilles.*—A handsome, low-growing, evergreen, greenhouse shrub, growing a foot high, or upwards, having rigid hairy branches, and alternate ovate or cordate-ovate acute leaves, serrated and usually shining above. The flowers grow in simple axillary or terminal secund racemes, and are tubular-ovate, contracted at the mouth, rose-coloured, the pedicels having comparatively large, ovate, acute, rosy bracts at their base. From the Andes of Columbia. Introduced in 1848. Flowers in summer. Royal Botanic Garden, Kew.



Gaultheria bracteata.

GLADIOLUS GANDAVENSIS, CITRINUS, *Van Houtte.* Citron-coloured Gladiolus (*Flore des Serres*, t. 539).—Nat. Ord., Iridaceæ. A fine variety of the natalensis section of the genus Gladiolus. It differs from G. gandavensis, from which it appears to have been raised, only in the colour of the flowers, which are of a full citron yellow, the lower segments of the perianth having a narrow band of red down the centre. A hardy bulb, with sword-shaped leaves, a stem two to three feet high, bearing long crowded upright racemes of flowers. A garden variety raised by M. Lemonier of Lille, in 1848. Flowers during summer.

HOYA OVALIFOLIA, *Wight and Arnott.* Oval Hoya (*Paxt. Fl. Gard.*, i., t. 23).—Nat. Ord., Asclepiadaceæ § Stapeliæ.—A pretty stove climbing shrub, with opposite, narrowly oval, three-nerved fleshy leaves, the margins of which are recurved. The compact umbels of flowers grow on peduncles which are rather shorter than the leaves; the flowers themselves are fleshy yellow, the coronet being stained with red; in form the segments of the corolla are ovate acute, the lobes of the coronet are revolute at the edge. From tropical India. Introduced by Mr. Gibson before 1840? Flowers in summer. Duke of Devonshire.

PITCAIRNIA JACKSONI, *Hooker.* Jackson's Pitcairnia (*Bot. Mag.*, t. 4540).—Nat. Ord., Bromeliaceæ.—A handsome stove herbaceous plant, with a pine-apple-like habit, producing many suckers from the base. The leaves are subulate-ensiform, a foot or more in length, the upper half spinulose-serrate; they are dark green above, clothed below with a pulverulent substance. The scape is leafy below, pulverulent, bearing a copious erect raceme of handsome scarlet flowers; the calyx of three imbricated erect sepals about three quarters of an inch long, red, with a yellowish margin; the corolla nearly three inches long, curved, the petals linear oblong, not at all spreading. From Guatemala. Introduced about 1847. Flowers in summer. Messrs. Jackson of Kingston.

ACINETA DENSA, *Lindley.* Close-flowered Acineta (*Paxt. Fl. Gard.*, i., 91).—Nat. Ord., Orchidaceæ § Vandeæ Maxillaridæ.—A pretty stove epiphyte, nearly related to A. Barkeri. The pseudo bulbs and leaves are not described. The flowers grow in dense short pendulous racemes, and are pale yellow, slightly spotted externally with crimson; the lip is yellow at the point, spotted with broad blotches on the lateral lobes, and deep crimson in the space between them; the flowers are somewhat fragrant. From Costa Rica; Turialbia. Introduced in 1849, by Mr Skinner. Flowers in summer. Messrs. Lane and Son of Berkhampstead.

Acer villosum, *Wallich*. Villous Sycamore (*Paxt. Fl. Gard.*, i., 107).—Nat. Ord., Aceraceæ.—A tree said to be hardy. It has broad heart-shaped angular leaves, which are five inches across, having the two lower lobes shorter than the three upper ones. It bears close shaggy panicles of small green flowers, succeeded by keys rather more than an inch and a half long, hairy and wrinkled at the base, but smooth on the winged part. The young wood, and the stalks and under sides of the leaves, are clothed with short soft hairs. From the Himalayas. Introduced? Flowers? Messrs. Osborne and Co., Fulham.

Campylobotrys discolor, *Lemaire*. Two-coloured Campylobotrys (*Flore des Serres*, t. 427).—Nat. Ord., Cinchonaceæ § Cinchoneæ.—A dwarf soft-stemmed herbaceous stove plant, interesting rather from the colouring of its stems and leaves than from the showiness of its flowers, which, however, are rich red, and are rather numerously borne on stalked axillary clusters. The stems are reddish purple, with opposite approximate branches; the leaves opposite rather large, ovate, entire; the upper surface of a lurid shining satiny green; the lower side tinted with red; the stalks also red. The flowers, which are very freely produced on dwarf plants, grow in crowded one-sided, circinate racemes, elevated on crimson stalks; they are rich red, salver-shaped, with a deeply four-parted spreading limb, and when numerous on a healthy plant have a very interesting appearance. Supposed to come from Bahia, or, according to some, from Mexico. Introduced in 1849. Flowers in summer, and probably through great part of the year.

Trichosacme lanata, *Zuccarini*. Woolly Trichosacme (*Paxt. Fl. Gard.*, i., 105).—Nat. ord., Asclepiadaceæ.—A very remarkable stove plant; but of no beauty. It is a climber. The whole surface, except the face of the corolla, is buried in wool, white, like a lamb's fleece. The leaves are stalked, ovate, acute. The flowers grow in pendulous umbels on reflexed peduncles, that spring from between the bases of the opposite leaves; they are minute, purple, and their singularity consists in the development of a long drooping feathery purple tail, at the end of each of the five lobes of the corolla; these tails spring forth abruptly, and wave in the wind in the most curious manner. From Mexico. Introduced in 1849. Flowers in summer. Messrs. Knight and Perry of Chelsea.

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PENDENT, OR WEEPING DECIDUOUS TREES.

By Mr. P. F. KEIR.

THE deciduous weeping trees, cultivated in the gardens of England at the present day, are somewhat numerous, and belong to genera, which are for the most part well known. The following list contains, I believe, all that have yet been raised, which are worthy of enumeration, as possessing the pendulous character:—

Salix babylonica, var. *pendula* (Weeping Willow). Of all the weeping trees, there is perhaps none which has been so widely distributed as this, or which is so familiarly known. From the graceful and slender character of its branches, as well as the fact of its thriving best in a damp or moist situation, it is generally planted along the margins of lakes or streams. In particular situations it may also be placed with good effect in the pleasure-ground; but perhaps its most appropriate situation is beside the tombs of the honoured dead. "The Weeping Willow," says Poiret, "conveys a picture of the grief felt for the loss of the departed. Its light and elegant foliage flows like the dishevelled hair and graceful drapery of a sculptured mourner over a sepulchral urn, and conveys those soothing, though softly melancholy reflections, which have made one of our poets exclaim, 'there is a pleasure even in grief.'" This is not adapted for planting singly, but should appear to emerge from, or overhang other trees; and if in the vicinity of water, so much the better.

Quercus Ægilops, var. *pendula* (Weeping Valonia Oak). This variety has the general character of the species to which it belongs, in which the leaves are ovate oblong, much toothed, and somewhat downy beneath. It is much less extensively distributed than some others; but in its general aspect, it is a very beautiful tree, and may with great effect be planted singly in any open and conspicuous situation.

Quercus pedunculata, var. *pendula* (Weeping Common Oak). The best example of this variety is to be seen in the Park of Sir G. Cornwall, Moccas Court, Herefordshire, where it grows nearly eighty feet high, having its long pendent and slender branches covering a space of more than a hundred feet. When well grown, this forms one of the most beautiful and interesting objects, either for the park or pleasure-ground.

Quercus Cerris, var. *pendula* (Weeping Turkey Oak). The branches of this variety are slender, and immediately take a downward direction, creeping over the sward for some distance after they touch it.

Fagus sylvatica, var. *pendula* (Weeping Beech). When the common Beech is grown to a considerable size, the branches assume a fine spreading form, which, in any situation, renders this tree extremely picturesque; but assuredly nothing can surpass the gracefulness and beauty of a true Weeping Beech. This variety, though quite hardy, should not be planted in an open exposed situation, as it is liable to be injured by strong winds. It has a tendency to hang on one side; and, therefore, much care and attention are required to give it a regular form. For this purpose, it is advisable to graft it on a high stock, inserting several grafts, so that branches may grow all round.

Fagus purpurea, var. *pendula* (Weeping Purple Beech). The leaves of this are distinguished from those of the preceding, by being of a much darker colour; in most cases being of a deep purple. Fine examples of it are to be seen at Waterer's American Nursery, Bagshot, Surrey, where it grows fully thirty feet high; but, like the other, mostly to one side. It forms a remarkably striking object when judiciously placed among trees having leaves of the usual green colour.

Ulmus montana, var. *pendula* (Weeping Mountain Elm). This is a strong and vigorous tree, the branches of which take a decided inclination towards the ground—not, as in some cases, borne down by the weight of their extreme parts, but spreading out like a fan in a direction between the horizontal and perpendicular. Being of very vigorous growth, it attains a considerable size in a few years. The leaves are large, rough, and dark green. This forms a remarkably handsome object as a single tree for a broad lawn. Fine examples of it are to be seen in the garden of the Royal Botanic Society, Regent's Park; the garden of the Horticultural Society; and several other places round London.

Ulmus glabra, var. *pendula* (Weeping Smooth-leaved Elm). The introduction of this variety is of more recent date than the others of the same genus. It is said to have been raised by Mr Smith, nurseryman at Worcester, in 1810; and is by some called the Downton Weeping Elm. It is freer and more slender in its general habit than the variety of montana: the leaves are scarcely so large, but of as dark a colour. When grown twenty or thirty years, it forms a very striking object in an exposed situation.

Ulmus campestris, var. *pendula* (Weeping Common Elm). The general appearance of this is somewhat more delicate and graceful than the preceding; the leaves are about the size of those of the common upright elm, and the branches slender.

These weeping varities of Elm have been in cultivation for some time. There is, however, one of but recent introduction, described as having variegated leaves distinctly marked with bright yellow blotches. It is, we believe, grown by a nurseryman near Huddersfield. One or two others have been mentioned, but it is not certain that they merit particular notice.

Fraxinus excelsior, var. *pendula* (Weeping Ash). This is a variety of the common ash, from which it differs only in its drooping habit. With the exception of the Willow, it is perhaps the first weeping tree known to English horticulturists, having been raised in Cambridgeshire early in the last century. It is now as common as it is graceful; for it is almost in every garden, and forms the best example of a weeping tree of which we have any knowledge. It is of very rapid growth, and forms so complete a shade that it may be trained with great advantage as an arbour, having a seat erected round its stem.

Fraxinus excelsior, var. *pendula aurea* (Golden Weeping Ash). A variety of recent introduction, with all the habit of the old variety, but having the bark of a deep yellow colour.

Fraxinus excelsior, var. *verrucosa pendula* (Warted Weeping Ash). This differs but little from the other weeping varieties of this genus, and may only be noticed as forming one of the number having the same habit. The bark is distinguished by numerous warts.

Fraxinus lentiscifolia, var. *pendula* (Weeping Lentiscus-leaved Ash). This is, on the whole, of a more graceful character than the others, the branches being more slender, and small and neat. It grows with rapidity in a sheltered situation, and soon forms a very handsome tree.

Persica vulgaris, var. *pendula* (Weeping Peach). This was originally raised from seed by Mr. Reed of New Jersey, and is a very elegant variety. It is only valuable on account of its beautifully pendent habit; and as it flowers freely, and has the general drooping character of the Weeping Ash, it forms a highly-ornamental object for the lawn, being covered in spring with its numerous white blossoms. It should be grafted on high stocks, as the shoots take a perpendicular direction, and grow rapidly.

Populus tremula, var. *pendula* (Weeping Aspen Poplar). The leaves of the Poplar or Aspen, from their having long slender stalks, are always seen in a state of quivering or trembling; hence the specific name. The variety under consideration has all the gracefulness of a true weeping tree; but compared with the weeping varieties of the Ash or Elm, it has a much lighter and freer aspect. Unless planted in a situation which is not much exposed to wind, it generally grows to one side. A good example of it is to be seen, on a small scale, in the pleasure-ground of J. Anderson, Esq., The Holme, Regent's Park, as well as in several other places round London. Two other varieties, distinct from the present, have been noticed, but very little is known respecting them.

Betula alba, var. *pendula* (Weeping White Birch). The chief characteristic of this variety is its great lightness; and when seen at a little distance, either in summer or winter, the branches appear to hang down like so many tendrils or small cords. If planted singly, it should have plenty of shelter; but when placed among other trees, it has a very elegant appearance.

Betula populifolia, var. *pendula* (Weeping Poplar-leaved Birch). This has the leaves larger than the preceding, and nearly like those of the Poplar. In other respects there is little to distinguish it.

Sophora japonica, var. *pendula* (Weeping Sophora). This has some resemblance to the laburnum, having long slender branches and elegant pinnated leaves. When grafted on a high stock it becomes a handsome and highly-ornamental tree in a few years. It is not so common as some of the other weeping trees already mentioned.

Pyrus Aucuparia, var. *pendula* (Weeping Mountain Ash). In some cases this variety has not assumed the weeping habit so decidedly as in others. It has, however, an equal claim to notice among weeping trees with some others already admitted into the list: for when favourably grown it has all the pendulous form of the Elm, and is also very beautiful in spring.

Pyrus salicifolia, var. *pendula* (Weeping Willow-leaved Pear). Another variety with slender branches and willow-like leaves.

Cerasus vulgaris, var. *pendula* (Weeping Cherry). The present variety is of dwarf habit, but decidedly pendulous, and when in flower is very ornamental. It has the double recommendation of being at the same time a good bearer.

Cytisus Laburnum, var. *pendula* (Weeping Laburnum). A somewhat common and remarkably ornamental tree in spring and summer, when its pendent branches are loaded with its bright yellow flowers.

Tilia europea, var. *pendula* (Weeping Lime-tree). This has never been well described or fairly introduced to public notice, but is mentioned in some nursery catalogues.

Cratægus Oxyacantha, var. *pendula* (Weeping Thorn). The common Thorn, or "May," as it is sometimes called, from being associated with the enjoyments of childhood and youth, as well as from its great beauty, is a popular favourite; but a true weeping variety is an object of deep interest, and must only need to be seen to be admired by all. Several varieties of the Oxyacantha section are evidently just the kind of trees to produce the weeping forms; and being hardy and vigorous, they may be planted with perfect freedom wherever they are likely to appear to the best advantage.

Pavia rubra, var. *humilis pendula* (Weeping Pavia). When grafted on a good high stock of the common Horse-chestnut, this forms in a few years a very beautiful object in the early part of the summer, especially as it is then in full blossom, and has a fine effect among other trees.

Larix europea, var. *pendula* (Weeping Larch). The leaves of this beautiful variety are somewhat broader and shorter than those of the common upright tree. The branches are quite pendulous, and have a peculiar effect. It is probable, however, that more than one distinct variety of Weeping Larch may be recorded. Several handsome, but not very large trees of it are to be seen round London, both in nurseries and private gardens, and it forms a very elegant object in front of a drawing-room window.

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Miscellaneous Notices.

Vase, or en Gobelet mode of training fruit-trees.- In the gardens of the Luxembourg, at Paris, all the quarters containing fruit-trees are surrounded with borders, planted with cherry, plum, and apricot-trees, as standards; and some with excellent effect are trained in form of a *Vase* or *en Gobelet*, dwarf, or with a stem five feet or rather more in height. The head is formed hollow, in shape like a goblet, the shoots being annually tied to hoops of wood, adapted to the circumference required to give the desired form. Two hoops are sufficient, the two-year old wood being tied to one; and the equidistant regulation of the one-year old shoots is effected upon the other. As the *vase* or *goblet* widens, of course hoops of greater circuit must be prepared, either of new materials, or introducing an additional piece. In some instances the hoops were formed of round, apparently a quarter of an inch, iron rods; but wood is preferable to iron, for vegetation in contact with the latter is apt to be injuriously affected by the rapidity with which it heats and cools. Shoots are apt to spring up in the centre of the goblet; but they must be pinched in summer; and so all other irregularities of growth appear likewise to have been. The form is very ornamental; it can be produced at little expense; and the trees were well furnished with fruit buds. Suppose a tree to have six shoots, let them be tied at equal distances to a hoop placed horizontally, and then shortened a few inches above it, or so as to leave them a foot or more in length. From each of these, two shoots may be trained to the outside of a somewhat wider hoop in the following season; and thus by annually introducing hoops of a width proportionately corresponding with the respective diameters of the vase intended to be imitated, the desired form will ultimately be produced. The head of the tree will be completely balanced; and the branches will be more nearly equidistant than they could be by any other mode of training as a standard. I should prefer wooden hoops to iron ones. If weak, or if two or more pieces must be employed for the hoop, its circular form may be preserved by two small rods, secured diametrically across it.—*R. Thompson, in Journ. Hort. Soc.*

BARBACENIA ROGIERII.

Nat. Order.—Hæmodoraceæ.

Generic Character.—Barbacenia, *Vandelli.*—*Perianth* corolline, funnel-shaped, hairy-resinous outside; tube connate with the ovary at the base; limb six-toothed with equal erecto-patent lobes. *Stamens* six, inserted at the bottom of the lobes of the limb, erect, included; *filaments* plano-compressed, three-toothed at the apex, the middle tooth smaller and antheriferous; *anthers* linear, affixed by the back in the middle or near the base. *Ovary* inferior, three celled. *Ovules* numerous, inserted on placentas projecting from the central angle of the cell; *style* three-sided, three-parted; *stigma* capitate three-sided. *Capsule* inferior, somewhat three-sided, three-celled, loculicidally three-valved, valves bearing the septa in their middle, carrying away the placentas. *Seeds* numerous, angular.—Perennial herbs, met with in Brazil, between the 14° and 23° north latitude, in dry sunny places in the primæval mountain forests. Caudex simple or dichotomously branched, or two or three feet high, densely clothed with the remains of leaves; leaves spirally arranged at the summit, half-embracing, erecto-patent, narrow, acute, keeled, rather hard, adherent together at the base with a viscous-resinous juice; peduncles or scapes solitary or several between the leaves, one-flowered, roundish, or three-sided, covered with resinous hairs or clavate glands towards the summit, more rarely simply pubescent or rather glabrous; flowers large, clothed externally in the same way as the scape, of a beautiful green, red, or yellow, glabrous within, frequently variegated.—(*Endl. Gen. Plant.* 1261).

Barbacenia Rogierii.—Rogier's Barbacenia.—Leaves linear acuminate, closely imbricated, with broad semi-amplexicaul bases, finely spinuloso-serrate on the margins and keel, spreading and recurved; scape stout, tuberculated upwards, shorter than the leaves; petaloid lobes of the filaments broadly linear-oblong, deeply bifid, longer than the anthers; ovary about an inch long, triangular below, swollen above, ribbed and tuberculated in lines.

Synonymy.—Barbacenia Rogierii, *of the Belgian Gardens.*

DESCRIPTION.—Larger in all its parts than B. purpurea from which it is not easy to separate it by description. The stem is erect and stout, rising somewhat above the surface of the soil, and is marked with the scars of fallen leaves. The leaves are rather thin, striated, linear, acuminated, scarcely keeled at the base, which is expanded, half embracing the stem; they are closely imbricated at their bases, becoming spreading and recurved above, forming a dense, somewhat flattened, elongated bunch at the summit of the stem; the margins, as well as the midrib at the back, have numerous fine spinules, pointing both forwards and backwards irregularly. The scapes are single flowered, nearly erect, arising in the axils of the upper leaves, shorter than these, and clothed, especially toward the upper part, with blunt glandular points, giving a scabrous surface. The perianth more than two inches in expansion, is of a rich velvet-like purple blended with maroon; the tube adherent to the ovary, about an inch long, bluntly triangular below, and somewhat swollen above, the outer surface ribbed and clothed with glandular points like those of the scape; the segments of the limb are spreading, somewhat recurved, more than an inch long, the three outer lobes lanceolate, suddenly acuminated, the three inner lobes broader, terminating in a short apiculus, all marked with longitudinal parallel lines or ribs, which, on the midrib of the inner circle, and the exterior of the outer circle, are studded with minute elevated glandular points; the outer surface is shining, the inner velvet-like. Stamens six, inserted at the mouth of the tube, erect; the petaloid lobes of the filaments are broadly linear-oblong, and deeply bifid, half an inch long, forming a kind of coronet in the throat of the perianth; anthers shorter than the filaments, linear oblong; stigma thickened upwards, three-cornered.—A. H.

Theoretically some botanists consider the stamens in this genus to be eighteen in number, the bifid petaloid bodies, to which the anthers are affixed, being taken to represent a pair of barren filaments, standing right and left of each fertile stamen.

History, &c.—This very handsome plant was introduced to English collections in the early part of the present year, from the nursery of M. Van Houtte, of Ghent. We have no further account of its origin, although it is no doubt South American. Our drawing was made from a plant which flowered in the garden of the Royal Botanic Society in the Regent's Park, during the month of July; and our description was partly drawn up from additional examples, which bloomed shortly afterwards in the collection of Messrs. Henderson, of the Pine-Apple Nursery, Edgeware Road. The specific name under which it has been received in England from the Belgian gardens, has probably been given in compliment to M. Rogier, a member of King Leopold's cabinet, to whom Dr. Planchon has recently dedicated a genus of Cinchonaceous plants, of which some species are grown in M. Van Houtte's establishment (see p. 85).

Culture. The Barbacenias are tropical plants, and the smaller species, such as that now figured, are often found to grow naturally in places where vegetable soil has accumulated, and where, accordingly, while excited by the tropical atmosphere of the Brazilian forests, their roots can freely extend amongst the porous earth. In our stoves they grow readily either in a free and open compost of sandy loam, peat, and leafmould, or in one composed chiefly of turfy peat, provided the conditions of a moist tropical climate are maintained, and a sufficient supply of moisture is given to keep the roots at all times supplied with food; the pots must however be thoroughly drained, so that no stagnant water may collect in the soil. They are propagated by means of the sucker-like small side shoots, which may generally be obtained with roots if they issue from beneath, or in contact with the surface of the soil; or, if otherwise, must be treated as cuttings, and planted like the suckers of a Bromeliaceous plant.—M.

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THE ALOE FAMILY.

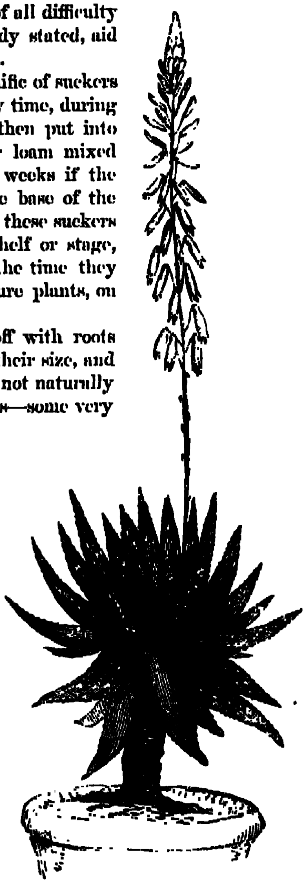
THE family of the Aloes—one of the largest groups of succulent plants—is now so seldom met with in cultivation, that its members fairly rank among what may be called neglected plants. Yet they comprise species of considerable beauty, added to an aspect so strikingly exotic, that their absence from any general collection of greenhouse plants is to be regretted. We propose to explain the leading features of their cultivation, in the hope that the absence of all difficulty in their management, may, in conjunction with the reasons already stated, aid in reviving the taste of amateur cultivators for a selection of them.

First—of propagation. The majority of these plants are prolific of suckers or side shoots, from the base of the plants, which, if taken off any time, during either spring or summer, somewhat dried before planting, and then put into moderate sized pots, well drained, and filled with sandy loam, or loam mixed with a third part of pounded bricks, will root readily in a few weeks if the soil is just kept moderately damp—neither so wet as to rot the base of the sucker, nor so dry as to exhaust its juices. The pots containing these suckers or cuttings, may be set in any part of the green-house, on a shelf or stage, or in a window where they will have the full sun; and from the time they are planted, such suckers will present all the appearance of mature plants, on a reduced scale.

In many cases these side shoots, or suckers, may be taken off with roots attached, and then require only to be potted in pots suitable to their size, and at once form established plants. Some of the species, however, do not naturally produce a supply of suckers or side shoots, except in rare instances—some very rarely, or never. Whenever, in the case of such species, suckers or side shoots are produced, advantage should be taken of the opportunity to propagate them, by planting them as already noticed. But when it is required to propagate any kind which obstinately refuses to furnish materials for propagation, the only alternative is to destroy the centre or heart of the plant, when side shoots will be produced, and these, when large enough, must be treated as cuttings.

The after-culture of these plants is as easy as their propagation. The principal features of their treatment may be pointed out under the heads soil, watering, and situation.

The proper situation for them is the greenhouse; that is to say, while they are just protected from frost on the one hand, they do not require more than a temperate degree of heat on the other, so far as artificial heating is concerned. We find them to do well and flower very abundantly, in a small greenhouse having a south-west aspect, the lights of which are never opened for the purpose of "giving air," except, perhaps, in the hottest days of summer; and to which fire heat is only applied with the view of just keeping out the frost. The species which are of suitable size will do well in a sunny window, and may be kept permanently inside, from one year's end to another, without suffering from their confinement, care being taken to remove them, if necessary, beyond the reach of frost, or, if a slight frost should catch them, to thaw them gradually by the



Aloe picta.

application of the *coldest* water, before the sun has had an opportunity of breaking their icy chains. The small sorts do admirably in a Wardian case; and any, or all the species might be successfully grown, in one of those Wardian cases "of a larger growth," which we hope soon to see interesting many an amateur who cannot bestow sufficient time and attention on a greenhouse of the ordinary construction.

As to soil, the Aloes can have no better compost than pure yellow loam, of a free and open texture, intermixed with about a fourth part of pounded bricks broken up quite small, the dust as well as the small lumpy pieces being added to the loam, and the whole intimately blended. All the species which attain a moderate size should have pots in proportion, not only on account of their producing roots freely, but also because their thick fleshy leaves sometimes render the plants awkwardly top-heavy, if they are in too small pots. The pots must, however, be thoroughly drained, upon the most efficient plan; and, providing this is done, and the kind of soil, above recommended, is used, there need be no fear of employing pots of too large a size for the larger sorts. As with the majority of greenhouse plants, potting may be done any time from early spring onwards through the summer; it is best not done too late in the season, though it *may* be done at any time, if due care is afterwards exercised in the application of water. The small sorts never need large pots.

As to watering, the general rule is to *apply water just before the plant reaches that condition in which it would begin to droop or shrivel.* In all cases, therefore, it must be less frequently given in winter than in summer, on account of the difference in the amount of evaporation going on at these two periods. Certainly Aloes and other succulent plants, require less water within a given period, at any season, than most other plants, on account of the slower process by which moisture passes away from them. In summer they may need watering once in two days—seldom, if ever, daily; in winter they may not need any attention of this kind for a month, or even two months, at a time. The only danger, however, is that of giving too much in winter; and it may, therefore, be taken as a safe rule to wait for indications of shrivelling in the lower leaves before water is applied, at that season. With proper soil, potting, and moderate care, they will not be liable to be over watered at any other season.

We shall now enumerate a limited selection of distinct kinds, which are worth growing, either for their exotic aspect, the curiosity or beauty of their foliage, or for the showiness of their flowers. The flower stems of most of the larger Aloes form simple upright racemes, which are clothed with drooping, tube-like flowers, comparatively large; and these, when highly coloured, are very ornamental:—

RHIPODENDRON.—*R. plicatile* has a forked stem, the leaves arranged in two rows, and the tubular red flowers straight.

PACHIDENDRON.—*P. africanum*, 8 feet, red; *P. ferox*, 6 feet, yellowish; *P. suproalare*, 5 feet, orange, are some of the larger single-stemmed forms of Aloe, with straight flowers.

ALOE.—*A. purpurascens* is a tall forked-stemmed species, with reddish flowers; *A. vulgaris*, 12 feet, yellow; *A. lineata*, 5 feet, scarlet; *A. prolifera*, 2 feet, orange; *A. saponaria*, 4 feet, red; *A. suberecta*, 3 feet, scarlet; *A. variegata*, 3 feet, pink; *A. albocincta*, 3 feet, has its orange flowers in a branched or corymbose head. These also have the flowers straight.

GASTERIA.—*G. nigricans*, 2 feet, red; *G. subcarinata*, 2 feet, orange; *G. verrucosa*, 2 feet, red; *G. maculata*, 2 feet, scarlet. The flowers of these are tubular, curved, and more or less swollen; and they are mostly tipped with green.

APICRA.—Small plants, with greenish white flowers, small, and somewhat two-lipped; they are more curious than showy. *A. spiralis*; *A. pentagona*; *A. imbricata*, are interesting-looking plants.

HAWORTHIA.—Small plants similar to the Apicras, and destitute of showy flowers, these being greenish white. *H. translucens*, quite transparent; *H. atrovirens*; *H. planifolia*; *H. margaritifera*; *H. retusa*; *H. reticulata*, are interesting species.

With the above, or a similar collection, the Aloe-house would be kept gay and interesting from early spring quite through the summer. The Haworthias and Apicras are especially suitable, from their diminutive size and curious structure, for the smaller Wardian cases, usually seen placed in windows.

Some of the species of Aloe are interesting as furnishing the drug—Aloes—employed in medicine, and which seems to be obtained from several of the kinds having large juicy leaves. Three kinds are prepared; the best by draining the leaves, the next by pressure, and the third, or worst quality, by boiling.—M.

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Sacred Botany—Lign Aloes.

THE Hebrew terms *ahalim*, and *ahaloth*, considered as forms of the same word, indicate some highly odoriferous substance, as is evident from the connection in which they occur. They are translated Lign-Aloes (aloe-wood) and Aloes, in the Authorised version; and Biblical critics seem now agreed that the substance indicated is the fragrant Eagle wood of India, produced by the Aquilaria Agallochum, a very large tree occurring in the forests of Silhet and Assam. It is also agreed that the nauseous drug, the produce of the true Aloe plants, is not intended; unless indeed it be, as suggested by Lady Calcott, in St. John's account of the entombment (xix., 39), where we learn that a hundred pounds weight of myrrh and Aloes were wrapped with the body—Aloes being, as she states, one of the drugs used by the ancients for embalming, its strong sweet odour and bitterness combined adapting it for the purpose of keeping off destructive insects. Others, however, adopt a different view; and, in particular, Dr. Royle, whose opinion is of the highest authority in these matters, thinks that there can be little or no doubt that the odoriferous *agila* (the Malay name of the Agallochum of commerce,) is intended in the passage of John xix., 39. When the body of our Saviour was taken down from the Cross, Nicodemus, we are told, brought a mixture of Myrrh and Aloes for the purpose of winding with the body, in the linen clothes, as the manner of the Jews is to bury. The quantity (100 lbs.) brought in this instance has been objected to by some writers, and Dr. Harris has suggested that instead of ἑκατόν, it might originally have been δεκατόν ·10 lbs. weight. It is well known, however, that very large quantities of spices were occasionally used at the funerals of Jews; and before objecting to the quantity of this expensive wood, Dr. Royle remarks that the disputants should have ascertained the *proportions* in which it was mixed with the myrrh, an article sufficiently abundant and of moderate price. Dr. Harris has moreover objected that "the Indian Lign-Aloes is so odoriferous and so agreeable, that it stands in no need of any composition to increase or moderate its perfume;" but this very excellence makes it better suited for mixing with less fragrant substances. Common Aloes could never have been used as a perfume.

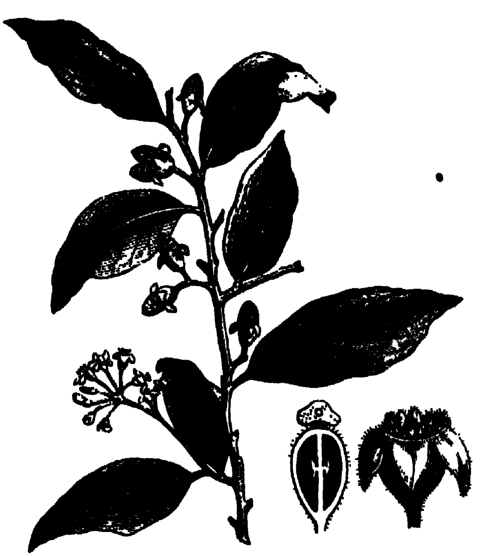
The word translated Aloes is usually employed in connection with the names of other fragrant products of the vegetable kingdom, and it is significant to notice that the same substances of Eastern origin are repeatedly mentioned with it. Thus: "All thy garments smell of myrrh, aloes (*ahaloth*), and cassia." (Psalm xlv., 8.) "I have perfumed my bed with myrrh, with cinnamon, and Aloes (*ahalim*)." (Prov. vii., 17.) "Spikenard and saffron; calamus and cinnamon, with all trees of frankincense; myrrh and Aloes (*ahaloth*), with all the chief spices." (Cant. iv., 15.) Lign Aloes occurs but once in the English version: "As the trees of Lign Aloes (*ahalim*) which the Lord hath planted; and as Cedar trees beside the waters." (Numb. xxvi, 6.) This passage is considered difficult, as the true reading is doubtful, some versions having *ohalim* (tents) instead of *ahalim*. The words, spoken by Balaam, are perhaps figurative and poetical; certainly the objection taken, that "a substance indigenous in a country, was in those early times unlikely to have been also an article of commerce from a far country" (*Penny Cyclopædia*) is of little weight, for, taking the words figuratively or literally, it by no means follows that the trees were "planted" either in Palestine or in any of its borders. The expression may with more apparent reason be taken as an admission of ignorance on the part of the speaker, of the locality or habitat of a tree, of which the produce (wood) was commercially known to him; or at least as a reference to the natural habitat of some noble tree, for we read elsewhere of "the Cedars of Lebanon which He hath planted," which expression is obviously figurative.

Of the Aloe wood itself, the information is abundant. We must confine ourselves to a condensed summary of Dr. Royle's conclusions. Pliny and Dioscorides appear to furnish the earliest notice of this substance, both describing it as brought from India. Dioscorides, who calls it *agallochum*, is quoted by the Arabian writers, Serapion and Avicenna. The Latin translation of Avicenna gives it the names *Agallochum*, *Xilaloe*, and *Lignum Aloes*; but in the Arabic edition it is treated under the names *aghlajoon*, *aghalookhi*, and *'aod*, pronounced *ood*. The Persian works on Materia Medica give *agallokhee* as the Greek name of this substance; whilst the Hindoo name of one kind, by them called *aod-i-hindee*, is *aggur*. Having obtained the substance called *aggur*, and traced it through its Asiatic synonymes to the *Agallochum* of Dioscorides, Dr. Royle found in the bazaars of Northern India three varieties of this fragrant wood. Dr. Roxburgh states that the Sanscrit name of the incense or Aloe wood is *ugooroo*, which in Hindee is called *ugoor*, and in Persian *aod-hindee*, and that there is little or no doubt that the real *calambac* or *agallochum* of the ancients is yielded by an immense tree, a native of the mountains east and south-east from Silhet, in about 24° of North latitude. Small quantities of *agallochum*, he states, sometimes reach Calcutta by sea from the eastward, but such is always deemed inferior to that of Silhet. This tree he named Aquilaria Agallochum. Another species, the A. malaccensis (also called A. ovata), the *Garo de Malacca*, on the authority of Sonnerat, yields the *bois d'aigle* of commerce. Thus two allied trees of the genus Aquilaria are ascertained to yield the fragrant wood under consideration.

A plant called by Loureiro both Aloexylon Agallochum and the Lignum Aloes, a large tree growing on the lofty mountains of Champava, belonging to Cochin China, has also always been admitted as one of the trees yielding true *Agallochum.* Another plant mentioned by Rumphius and called Excœcaria Agallochum—so named "because its wood is similar to, and often substituted for *Agallochum*"—a Euphorbiaceous tree common in the delta of the Ganges, and often the only one quoted as yielding agila-wood, is ranked as a spurious kind, though Dr. Royle thinks it may in some situations yield a substitute for the true sort.

The Malay name of the Agallochum as already intimated, is *agila;* and it is exceedingly interesting to find this so little different from the Hebrew. It is probable that it was by the name *agila,* that this wood was first known in commerce; certainly the Portuguese obtained it under this name whence they called it *pao d'aguila,* or Eagle wood, which is the origin of the generic name Aquilaria. This term *agila,* which Dr. Royle supposes to have been converted in Hebrew into *ahel* (masculine), and from which were formed *ahaloth* and *ahalim* (plural), appears to have been the source of its confusion with the true Aloes; for Sprengel suggests that the primitive name is preserved in the Arabic *alloch* and *allich,* which come externally near *aelwa,* pronounced *elwa*—the Hindoo name of the medicinal Aloe.—(*Cyclop. of Biblical Lit.*)

The *garo,* one of the genuine kinds of *agallochum,* has long been an article of export from Malacca and Siam, the greater part being exported to China; though in Siam there is considerable home consumption. It is stated that the Chinese use it in a very economical manner; the wood being reduced to a fine powder, and mixed with a gummy substance, is thickly coated over small slips of wood, which being lighted give out a feeble but grateful perfume.



Aquilaria Agallochum.

The *Agallochum* of Silhet, according to a MS. account quoted by Dr. Royle, yields four different qualities from the same tree:—1. *Ghurkee,* which sinks in water, and sells from 12 to 16 rupees per seer of 2 lbs.; 2. *Doim,* 6 to 8 rupees per seer; 3. *Siniula,* which floats in water, 3 to 4 rupees; 4. *Choorum,* which is in small pieces, also floats in water, 1 to 1¼ rupee per seer. Sometimes 80 lbs. of these four kinds are obtained from one tree. Another account, by Mr. Colebrooke, quoted by Lady Calcott, gives the name of the heaviest dark coloured pieces which sink in water as *gharkhi;* that of the next quality, *nim gharkhi;* and that of the two inferior sorts, *temlah.* All the trees do not produce the *aggur,* nor does every part of even the most productive. The natives cut into the wood until they observe dark coloured veins yielding the perfume; these guide them to the places containing the *aggur,* which generally extends but a short way through the centre of the trunk or branch. An essence or attur is obtained by bruising the wood in a mortar and then infusing it in boiling water, when the attur floats on the surface. A large specimen of the tree in the Museum of the East India House displays a cancellated structure, in which the resinous parts remain, the rest of the wood having been removed apparently by decay. Lady Calcott mentions that the choicest pieces sell for their weight in gold; they seem to have no smell until warmed by the hand, when they become dewy, and exhale a most delicious odour. The resinous substance to which the fragrance of the wood is owing, is considered a cordial by some Asiatic nations; and has been prescribed in Europe in gout and rheumatism.

The Aquilaria Agallochum is an immense tree in its native forests; its branches clothed with alternate, subsessile, oval acuminate, glossy leaves, from the axils of which grow the flowers, in compact simple clusters; these flowers are small, apetalous, consisting of an urceolate calyx with five reflexed teeth, the orifice closed with ten hairy scales, alternating with ten sessile anthers, surrounding the capitate stigma; they are succeeded by obovate mucronate reddish brown two-valved fruit. It belongs to the order Aquilariaceæ, a group of arborescent plants, confined to the tropical parts of Asia, and in their botanical affinities connecting the group of the Buckthorns with that of the Spurge laurels.

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Reviews.

Hortus Britannicus: A Catalogue of all the Plants, Indigenous, Cultivated in, or Introduced to Britain. By the late J. C. Loudon, F.L., H., G., and Z.S. *A New Edition, with a Supplement, including all the New Plants, down to March* 1850; *and a New General Index to the whole Work.* Edited by Mrs. Loudon; assisted by W. H. Baxter, and D. Wooster. London: Longmans.

Loudon's *Hortus Britannicus* is well known in the gardening world as the most complete in its details of any of the catalogues of plants which have issued from the press. "After the appearance of the first edition, in 1830, additional supplements were published from time to time, as the introduction of new plants rendered lists of them necessary; but as these supplements were separate from each other, it was found they were troublesome to refer to, and it was at last thought desirable to amalgamate them into one, which has been done in the present edition, adding all the new plants which have been introduced since the publication of the last supplement, up to March in the present year. The whole work has also been carefully revised, and fresh references to engravings of plants have been added, so as to make the work as perfect as possible." These statements, which form part of the Preface, explain the peculiar features of the present edition; to which we can add but little, except that the supplementary matter—which now occupies from p. 479 to p. 686—is prepared in the same detailed manner as that forming the body of the work. The flowering and cryptogamic plants are separated, each being arranged alphabetically; this division would, however, have been *more* perfect and convenient, had the Ferns been placed with the latter instead of the former class. The alphabetical arrangement, though it has been objected to by some, we have found to be, practically convenient, facilitating reference to the genera enumerated; and, on the whole, it is the most generally useful that could have been adopted, although, doubtless, the profound botanist—if indeed such a person would require to use a garden catalogue at all—would prefer a more "systematic" plan.

There are some minor defects apparent; as, for instance, the publishers give the title-page the date of March 1850: it would have been more fairly printed 1849, as the *new* plants, "up to March 1850," are but partially introduced. Again, on turning over a few pages at random, we find such inadvertencies as the following:—Under Pentstemon (p. 604), the specific names are inserted with varying terminations: for instance, azure*um*, specios*a*, heterophyll*us*; the two first of which are erroneous; or allowing this to be a point upon which "doctors differ," two of the three forms of construction must still be wrong. The authorities for both generic and specific names are not always correctly given. The genus Phaius is referred to Paxton instead of Loureiro; Alloplectus to De Candolle instead of Martius; Philodendron to Lindley instead of Schott; and so on. The species Franciscea acuminata is referred to Paxton instead of Pohl; Hakea Victoriæ to Hooker instead of Drummond; Ixora javanica to Paxton instead of De Candolle, &c. Considering that gardeners, for the most part, take the "Catalogues" of this class as their authorities, in all that relates to the orthography of the names of plants, these inadvertencies should have been avoided. Niphea rubra (p. 594), inserted doubtfully, is no doubt N. rubida, *Lemaire*. Nordmannia cordifolia (p. 595), is stated to be a Thymelaceous perennial herb; the plant grown under this name appears to us to be the old Borago orientalis. Nuttallia cerasiformis, a Rosaceous shrub, is associated with those Malvaceous plants which have borne a similar generic name. Poa Balfourii is fully inserted at least three times, and under different generic names. Under Passiflora, we find a species Billottii—which is probably the correct orthography of that figured as Belotti in our first volume.

Practically, and notwithstanding the existence of such errors as we have named, this edition of Loudon's *Hortus Britannicus* may be regarded as a complete register of introduced plants up to the autumn of 1849; quite as free from errors of importance as any book of its class, and much more useful than any other yet produced, on account of the greater amount of information embodied in its close-printed pages.—M.

A Popular History of British Sea Weeds, &c. &c., with notices of some of the Fresh-water Algæ. By the Rev. D. Landsborough, A.L.S., &c. London, Reeve, Benham, & Reeve.

A pretty volume, forming one of a series on the principal branches of Natural History, issued by Messrs. Reeve & Co., the object of which is to popularize the subjects treated of, and to present them in a form especially attractive to the young. Of course in a small book of some 360 pages, the depths even of any single branch of natural science cannot be fully explored. We find, nevertheless, in the instance before us, a sufficiently complete sketch of the British Algæ, for beginners in algological investigations; and the reverend author has thrown in a rich variety of pleasing and instructive information on the structure, vegetation, fructification, distribution, and uses of the generally little known plants to which his volume is devoted.

"Call us not weeds—we are flowers of the sea,
For lovely and bright, and gay-tinted are we;
And quite independent of culture or showers;
Then call us not weeds—we are Ocean's gay flowers."

The first portion of the book is devoted to the general subject, followed by a particular account of the genera and species. It is well illustrated by twenty coloured plates, by Fitch, on which are given figures of eighty of the most distinct and showy forms; there are also two plates illustrating their fructification. From the chapter on the "vegetation of sea-weeds," we select the following interesting extract as a specimen:—

"In the very end of September 1848, D. Landsborough, jun., had brought from the sea-shore some rare nudibranchs, which he put in a tumbler of sea water, and placed in a window, with a south-east exposure. They lived there for several weeks, and when they began to look feeble, they were returned to the sea as a reward for their good behaviour. Before I granted manumission to the beautiful nudibranchs, I had observed at the bottom and on the sides of the tumbler, the growth of young Algæ. The first that I observed were grass-green, consisting of simple filaments, without any visible joints. . . There were also a number of little dense tufts of brownish-olive colour. . . In the body of the water were a few long filaments, almost colourless, finer than human hair, and so limber that they bent under the weight of the almost invisible infusoria, when they rested from their sportive gambols. Then there were others that were just perceptible as small dots by the naked eye, but when seen through a pretty powerful lens, they were perfectly circular, and of beautiful workmanship. . . Last of all, there was a number of very minute branched Algæ, just perceptible as a faint haze by the naked eye. . . Once a fortnight I pour off the water, and give a fresh supply from the sea.

"As my object is to aid in rendering my young friends not merely algologists, but diligent observers of the phenomena of nature, I shall not consider myself bound to adhere rigidly to one department of nature's works. To encourage them in their researches, I may mention that a single tumbler of water will form a rich field for their bright young eyes. This very tumbler which showed me the germination of Algæ from seed, exhibited also some beautiful Vorticellæ, and contained numberless infusoria of many kinds merrily dancing in all directions, and showing that He who made them blessed them with happiness. These animalcules I had seen before, but in watching their sportive gyrations, I was gratified with appearances which I had never before observed. Perceiving what I thought a little hazy spot on the glass, I applied a lens, and found that it did not adhere to the glass, but was moving up and down. Afterwards more than a score were observed, some of them little semi-pellucid, and I think, hollow balls; others were like broad flattened bonnets, such as are worn by carriers, with an aperture for the reception of the head. The largest, however, were less than a line in diameter, and of a light-grey colour. When the tumbler was allowed to remain unmoved, they lay invisible at the bottom, but when it was gently agitated they mounted up like little balloons to the surface of the water, and gradually descended. How they moved I could not tell. The surface of the balls, in certain lights, seemed a little hirsute, but I could observe nothing like the motion of cilia. When they were all in motion, some ascending and others descending, the mystic movements of their little spheres presented a very animated spectacle.

"But what were my little peripatetic puff-balls? At first I despaired of being able to tell, but fortunately I had beside me Sir J. G. Dalyell's recent publication, and turning over its pages and plates, I was delighted to find that what I contemplated with so much interest was the progeny of Medusa. I then tried an experiment on them which Sir John does not mention having done. I took the tumbler into a darkened apartment, and giving the glass a smart percussion, instantly my little puff-balls sent forth a very brilliant flash of phosphorescent light, showing me that in all likelihood they play no very secondary part in that beautiful phosphorescence of the sea, which in the wake of a vessel I had so often admired in a summer evening. I continued to watch them in the hope of seeing them transformed into Medusa bifida, but frost, of unusual intensity for the season, set in after the middle of October, and my medusettes sank under it. On trying to rouse them only one attempted to rise, and next day it had vanished—like another creature of greater pretension, 'fleeing also as a shadow and continuing not.' On contemplating the wonderful works of God, even in this little world of water, one is led to exclaim, in the singularly beautiful, and truly eloquent words of Hedwig—'Truly great and transcendently beautiful, OH JEHOVAH! are these Thy works, even here below. Framed they are in profound wisdom, disclosing all their charms only to our lens-aided eyes! How grand, then, will those be, which, when this glass has been removed in which we see darkly—when this mist of mortality has been scattered—Thou art pledged to reveal hereafter to thy servants that have worshipped Thee here in sincerity and truth! Ah me! how grand!'"

Under such teaching, the study of sea-weeds, while calculated both to please and instruct the juvenile mind, has the still higher recommendation of leading the thoughts onwards to those flowers of immortality, which are to be gathered, on the bright shores that lie beyond the Ocean of Time.—M.

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DWARF PINKS OF VERVIERS.*

LIEGE and Verviers are the only two towns in Belgium in which the Pink, including all the different kinds and classes, is held in honour; and there are in these towns extensive and influential societies for the promotion of the culture and exhibition of this flower. Even at Brussels amateurs would scarcely believe that the growers belonging to the towns already named, can exhibit pots of Dwarf Pinks in which from 180 to 200 flowers may be counted; and yet nothing is more common in these localities where the cultivation of the Pink is established. We may easily perceive with what class of the population the cultivation of Dwarf Pinks is most in favour. If the Pink is not the flower of the rich, neither is it that of the poor. It has more of dignity and greater value; it is the flower of honest labour. At Liége, for instance, the most industrious and the most moral part of the population is that including the colliers, who are famous for the good management of their window-gardens, which comprise, in a great measure, these Dwarf Pinks. The same observation applies to the artizans and mechanics of Verviers.

In a treatise published by Hoog [? Hogg], in 1820, we find mentioned the double Dwarf Carnation of Liége, having the flowers sessile, or without much stem. There is also mentioned a Tree Pink, having an under-shrub-like form, growing from five to six feet high, and which was grown on a trellis against a wall. It appears evident that the Dwarf Pink was unknown before the 19th century; and it is not less clear that this interesting creation originated in Belgium. The Dwarf Pink is, indeed, a remarkable plant, and confined to the banks of the Vesdre and the Weay, two rivers of Verviers and Spa. All the dwarf varieties formerly belonged to the series known as bizarres, the petals being fringed: but at the present day it is the custom, at Verviers, to make all indistinctly dwarf. Thus we see dwarf bizarres, dwarf picotees, dwarf flakes, and so on.

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* Abridged from *La Belgique Horticole*, a very interesting new periodical, edited by Prof. Morren.

There is, however, in cultivation, particularly in the trade, a race of Pinks having flowers smaller than those of the primitive species. They are generally rose purple, red, striated, or white; rarely yellow, or varied in the ground. These Dwarf Pinks would thus seem to claim kindred with the old bizarre, from which they are derived. At the recent exhibition of Pinks, held under the auspices of the Horticultural and Agricultural Society of Verviers, we had occasion to notice the excellent management which these Dwarf Pinks receive in that quarter. Of these, the productions of Messrs. L'Enfant were particularly deserving of notice. M. Barhon, also, had two specimens, the one having 184 flowers, and the other 178. These were indeed astonishing productions, combining all that is grateful in odour, elegant in form, and ornamental for the drawing-room conservatory.

The Dwarf Pinks of Verviers grow about four inches high: the stems are crowded with blossoms, the number of the flowers being very great; the corolla of a delicate rose colour, with the variations. The aroma of these flowers is very agreeable, and nothing can be more suitable for the boudoir or parlour. To produce a specimen such as those alluded to, requires about three years of careful cultivation. These Dwarf Pinks are usually grown in pots, painted outside of a deep green colour, and from five to six or seven inches wide at the rim. The most favourable aspect for them, if grown at a window, is that where they may have full exposure to the sun for the greater part of the day. The reflected warmth of the window-sills is also beneficial to their roots. The pots are not quite filled with soil, but to within about an inch of the rim; and, as the leaves extend, and cover the border or rim, a humid atmosphere is maintained around the stem or neck of the plants.

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Miscellaneous Notices.

Horticultural Society. November 5. Messrs Veitch, of Exeter, sent a good plant of the very showy Calanthe vestita; along with a single pseudo-bulb, bearing a single bloom of a small alpine form of Cœlogyne, named maculata; the flowers were pale blush, with a yellow lip, beautifully spotted and bordered with purple. Messrs. Henderson, of Pine-Apple Place, sent small plants of the new Pimelea macrocephala, a robust free-blooming kind, which may probably prove useful for exhibition. A beautiful small blush-flowered Burlingtonia, from Demerara, with blossoms in dense spikes, sent by a gentleman from Manchester, was awarded a Banksian medal. Mr. Salter, of Versailles Nursery, Hammersmith, had a new Pentstemon, apparently a variety of Hartwegii; the flowers are cream-coloured, with a red border to the limb. Mr. Hamp, gardener to J. Thorn, Esq., of Lambeth, had some finely bloomed plants of Epiphyllum truncatum, and with them three seedlings, of which one, intermediate in colour between the species and the violaceous variety, may prove worth cultivating. From the Garden of the Society were plants of the following:—Veronica Andersoni, an interesting hybrid, raised by J. Anderson, Esq., of Maryfield, between speciosa and salicifolia, and remarkable for having the upper part of the spike of blossoms purple, while the lower half is white; Angelonia moschata; Solandra lævis; Lyperia pinnatifida; a small scarlet-flowered Salvia, named pulchella; Dendrobium Gibsoni, and various others.

There was some good fruit produced. Of Pine-Apples, Mr. Ingram, gardener to her Majesty, sent two fruit of the smooth Cayenne, weighing seven pounds eight ounces, and seven pounds three ounces, admirable looking fruit. This variety possesses the recommendations of being not only one of the most easily grown of the large sorts, but also one of the best sorts as to flavour. Mr. Bray, gardener to E. Lousada, Esq., of Sidmouth, sent a Providence of eleven pounds' weight, to which a certificate was given. There were also some Queens, the largest weighing four pounds fourteen ounces. Of Grapes, Mr. Slowe, gardener to W. R. Baker, Esq., of Bayfordbury, sent a bunch of Hamburghs, weighing four pounds four ounces, a fine bunch, quite ripe, but quite red. Mr. Martin, gardener to Sir H. Fleetwood, sent three handsome bunches of West's St. Peters, the heaviest weighing one pound fourteen ounces; along with some unripe Muscats. Mr. Davis, of Oakhill, sent some well-ripened Muscats; another sample of greenhouse grown Muscats, from Mr. Forsyth, gardener to Viscount Barrington, were small. Some fine Van Mons Leon le Clerc Pears, were sent from Mr. Davis. Mr. Milne, gardener to Lord Clare, sent a sample of French Crabs, the produce of 1849.

Of miscellaneous articles, Mr. Fry, of Lee, Kent, sent a dish of peas, from plants which had been mildewed, and had been cured by sulphur. It seems established as a general fact, that sulphur is a specific against the mildew. Mrs. Dickens, of Hereford Street, Old Brompton, exhibited a very interesting series of flowers, partly executed on rice paper.

Painted by [illegible]

PHARBITIS LIMBATA.

Nat. Order.—CONVOLVULACEÆ.

GENERIC CHARACTER.—Pharbitis, *Choisy*.—*Calyx* of five segments. *Corolla* hypogynous, campanulate or funnel-shaped, limb spreading, five-plaited. *Stamens* five, inserted in the tube of the corolla, included, filaments dilated at the base. *Ovary* three- or four-celled, cells with two ovules; *style* simple; *stigma* capitate, granular. *Capsule* three- or four-celled, three- or four-valved. *Seeds* six or eight, erect. *Cotyledons* of the curved, mucilaginously albuminous embryo, corrugated, radicle inferior.—Twining herbs, natives of all intertropical regions; leaves cordate, entire or lobed; peduncles axillary, one- or many-flowered; corolla most frequently blue, variegated with white and purple.—(*Endl. Gen. Plant.* 3808.)

PHARBITIS LIMBATA, *Lindley*. Bordered Major Convolvulus.—Annual; stem hairy with retrorse hairs; leaves cordate, entire, angular, and three-lobed, hairy, lobes dilated at the base, acuminated above; peduncles solitary, one-flowered, half as long as the leaf-stalks; sepals hispid at the base, hairy at the apex, linear-acute, and very long.

SYNONYMY.—Pharbitis limbata, *Lindley in Journ. Hort. Soc.*, v. 33.

DESCRIPTION.—An annual twining herb, with very showy flowers. The stem is clothed with hairs pointing backwards. The leaves are hairy, broad; cordate at the base, and divided into three lobes above their middle; the lobes broad and somewhat ovate below, and then suddenly contracted to an acuminated point. The axillary flower-stalks are solitary, one-flowered, and about half as long as the leaf-stalks, and bear three subulate bracts about their middle; the calyx five-parted, the teeth very long, linear, acute, hispid at the base, and hairy at their tips; the corolla is large, funnel-shaped, and spreading, crimson in the tube, shading into intense violet in the limb, the violet colour terminating in five crescentic curves above, leaving a broad interrupted pure white border.

HISTORY.—A Java species, imported by Messrs. Rollison, of Tooting, through their collector, Mr. J. Henshall, in 1848, and first exhibited in October, 1849. "It appears to be an annual, seeding freely, and has much the appearance of Pharbitis Nil, from which it principally differs in the great length of its sepals, their excessive hispidity, and the shortness of the flower-stalk. The flowers, equal in size to the old Convolvulus major, but less spreading at the mouth, are of an intense violet edged with pure white, and have a beautiful appearance. A Brazilian Pharbitis referred to P. Nil by Mr. Gardner (No. 79 of his Herb.) is very near this, but has the long flower-stalks of that species" (*Lindley, l. c.*). It seems somewhat doubtful whether this be actually specifically distinct from Pharbitis Nil, which varies in the length of its peduncles. It is now known to be annual.—A. H.

CULTURE.—Messrs. Rollison state that it is a half-hardy plant, requiring similar treatment to that given to Thunbergias, and the old Ipomœa coccinea. Although they have not tried it out of doors, still they express a belief that it would grow very well in the open air, if planted against a south wall or trellis. It is a free growing climber. Being annual, it is of course increased by seeds.—M.

ABSORPTION AND FIXATION OF MANURES BY EARTHS.

BY J. TOWERS, ESQ., C.M.H.S.

THE previous article on this subject (p. 174) contained a list of those chemical tests, or re-agents, which will be required by any one who should attempt to prove the reality of those phenomena which science has very recently disclosed: to that list should be added a solution of lime, called *nitrate of lime*, made by gradually adding to diluted aqua fortis a few particles of chalk, or whitening, so long as the acid can dissolve the chalk, and produces any effervescence (or hissing). The clear fluid furnishes one of the most certain tests for oxalic acid that we possess.

After these preliminaries, I come at once to the results that have attended my own experiments, and which it is my object to assist others to work out, that no one may attach blind credence to assertions which cannot be supported by the evidence of positive facts. A method of preparing liquid manure of the simplest character, has been given in the former article. I have subsequently been, and am engaged in a series of experiments upon a sample of guano, obtained of Mr. Prosser, and which appears to be genuine, as that peculiar substance ought, but too rarely is found, to be; and here, I observe, in passing,—that every result of any analysis, announced by Messrs. Thomson and Way, in their two articles published in the *Royal Agricultural Society's Journal*, is fully sanctioned, or, at least, supported by the phenomena, which have been developed by myself during the course of that series.

Assuming that a liquid manure has been prepared according to the form before given, and a glass cylinder provided, 8 inches deep, and 3 or 4 inches wide, open at both ends, one orifice being of the full width, the other much contracted, but drawn out about an inch like the neck of a bottle; the process of filtration will be thus conducted. A piece of linen is fastened securely on the neck, and then, a quantity of good garden loam, screened to remove stones and fibres, is put into the vessel, so as to fill it exactly, without hollows, to within an inch of the upper or wide orifice. The earth should not be finely powdered, nor is it required to be quite dry; it is best when in that state which gardeners prefer for potting a fine rooted plant, when they mean the soil to touch and enclose every radical fibre, and yet so moist as to absorb every drop of water, and to distribute it equally throughout its substance. Glass vessels are to be preferred, because they permit the operator to watch the progress of the fluids: therefore, a stout tumbler, or some such glass, should be placed under the cylinder, to receive the liquid that will pass through the soil, and the linen drainer tied over the contracted orifice of the vessel. The apparatus thus arranged—two fluid ounces by measure-glass (*i. e.* about a common wine-glass) of the liquid manure (of which I presume that three-fourths of a pint are ready) are carefully poured over the whole surface of the earth, and left at rest to distribute itself through so much of it as it will saturate. Ten minutes will suffice, and then other two ounces are gently poured on the soil. If that be moderately loamy, as was my specimen, six ounces of the liquid, in three portions, each admitting a ten minutes' interval, may saturate the bulk; in which case two ounces more will produce the filtration through the linen of about an ounce of a *clear colourless fluid*. When that ceases to drop, the whole of it is returned over the top of the soil, and permitted to remain at rest, that chemical action may effect those surprising changes which the mutual play of affinities are now proved beyond any doubt to effect. I have found that a column of good kitchen garden mould, 7 inches deep, and 3½ wide, placed in a glass cylinder, supplied with twelve ounces of the liquid manure described in my previous article, yielded three ounces of colourless filtrate, the last droppings of which became tinged with the undecomposed manure. Whenever this effect is observed, the process must be stopped by the withdrawal of the receiving vessel, the contents of which are to be submitted to comparative experiments. These, to a practised chemist, are sufficiently simple; and to render them so to the young practioner, I recite the course adopted by myself since the publication of Professor Way's and Mr. Thomson's experiments. The absorption of ammonia, whether in the pure state, or combined with acids—in which latter case it was always attracted *from its acids*, and *fixed* by the earth—was the leading phenomenon observed by those gentlemen. Now, it should be remembered that, the solution from horse-droppings, described by me, was prepared with two fluid drachms of caustic ammonia, blended with about three quarts of soft water (rain water, as containing no lime, is to be preferred). The twelve ounces of clear liquid manure, obtained from the infusion, certainly contained some ammonia, though, most likely, in the state of *a humate*.

1. The first step was to present a piece of glass, moistened with a very little muriatic acid to, and just over the surface of the liquid contained in a shallow vessel like a watch-glass. That acid has an intensely strong affinity for free ammonia, and this it shows by producing a hazy white cloud of common sal ammoniac (in chemical language, hydro-chlorate of ammonia). The brown liquid *did* exhibit a faint trace of this salt, but one very much more dense, when a piece of quick-lime, or a few drops of caustic potash solution was added to it. The clear filtrate being then submitted to the same treatment, proved the great *abstraction* of ammonia. A trifling haze was indeed discerned, when the lime or potash was used, but *that* was occasioned by an excess of the liquid manure, some of which had passed unaffected by the earth, and begun slightly, to tinge the liquid in the receiver. And here, be it noted, that twelve ounces, or three-fourths of a pint of a strong manure, poured over a column of soil not 8 inches deep, must exceed, beyond comparison, the dose that could be applied in any process of gardening or agriculture.

2. A small quantity of the clear brown fluid was tested for lime by a few drops of oxalate of ammonia. Some trifling quantity of a soluble salt of lime—as the muriate, nitrate, or acetate—might be present in certain liquid manures, and in that case the oxalic test would produce greater or less turbidity; but in our experiment no such change occurred. But very different was the effect caused by dropping oxalate of ammonia into the clear filtrate that had passed from the soil. The turbidity was immediate; and the quantity of oxalate of lime was so abundant, that the liquid became milky white, succeeded by a copious deposit of white matter. This one phenomenon alone sufficed to verify all the leading facts announced by the two chemists before named. But how are we to account for such extraordinary, and heretofore uncontemplated mutations? The manure-water contained scarcely a trace of lime in any state; the soil which formed the filter gave little hissing or effervescence when strong muriatic acid was dropped on it; yet the *filtrate liquid* absolutely abounded with cretaceous matters, and to such a degree that a spirituous solution of soap was instantly curdled by it. In a word, the fluid was produced from the soil in the condition of extremely *hard water*—a result, by the by,

which points to another fact of deep interest; namely, that while manures, solid or fluid, yield up all their nutritious elements to loamy soils, to the point of saturation, they attract *from those soils*, and expel other elements which possess innutritive and deleterious qualities!

3. But now important questions present themselves; and to these we require of our re-agents clear and unambiguous answers. What then were the elements in the manure and in the earth which, by mutually attracting each other, produced such new combinations?

(*a*). *Barytes*, either as a nitrate or acetate, being dropped into the filtrate, gave a precipitate of sulphate of baryt; hence we are sure that sulphuric acid must have been present in the manure.

(*b*). *Nitrate of silver* caused an immediate deposition of the chloride of that metal, and thus proved the existence of hydro-chloric acid (muriatic) in the manure, in which, most likely, it had existed in the state of common salt.

(*c*). A little *carbonate of soda* in solution, added to another small quantity of the filtrate, caused a visible separation of a little chalk—a mere milkiness; which, however, sufficed to prove that some carbonic acid was there. This became more evident from the turbidity occasioned by a few drops of pure barytes water. Thus proofs demonstrative of the presence of two or three acids holding in solution definite quantities of lime, were obtained. These acids, at the moment of their development, *caused by the attraction of lime* in the soil, had quitted their ammonia, entered into close chemical union with *the lime*, and passed away with it, as a sulphate, muriate and carbonate, or compound hard water.

(*d*). The *ammonia* and the colouring humid matter, simultaneously liberated, became fixed in the soil, and so firmly, that any subsequent applications of rain-water failed to carry them away.

Enough has been said to induce reflection, and a course of rigid experiments. A large stride is made, and the march onward continues. Errors may perhaps be detected; but a true theory of manure promises to be the result.

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ON TRAINING THE CAMELLIA RETICULATA.

THOSE who are much engaged in growing the Camellia are well aware that the old species, called reticulata, is one of the most unmanageable to train into a good form; nor, indeed, is it likely to receive much attention on account of its own merits, while the number of far more beautiful varieties is being augmented every year. But though it is principally used as a stock on which to graft better sorts, there are but few collections in which it is not allotted a place; and it is certainly desirable to retain it, were it only to show, by contrast, the grand effects of cultivation. Its flowers also, according to the most advanced opinions of florists, are coarse and wanting in chasteness of outline; but their unusual size and showy colour compensate in some measure for their other defects.

C. reticulata is, however, on the whole very defective in character, and its flowers are not likely to be much improved; but, if it is worth growing at all in a collection, it should be trained to assume a much better form than that which it commonly has. In a communication published in the *Annales de la Société d' Horticulture de Paris*, M. Neumann briefly notices the results of an experiment which he made with a plant of this sort, and which, instituted by so eminent a cultivator, would seem to prove that this desirable object may be attained with complete success. M. Neumann narrates his experiment as follows:—"Last year, selecting a vigorous plant for my purpose, I commenced to pinch off the young shoots as soon as they were two inches long. The operation was performed about the end of April. This year, the same plant produced three flowers, and twenty-seven wood buds or shoots, of which a good number were borne on the wood three and four years old, a circumstance which never happens in the absence of such an operation." Pinching the young shoots, when properly performed, is always conducive to the growth of fresh wood, as may be seen in the dense and handsome specimens which are exhibited every year; but though this practice is familiar to all horticulturists, no one, excepting M. Neumann, appears to have thought it worth while to apply it to the variety of Camellia under consideration.—K.

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UROPEDIUM LINDENII.*

IF this is not the most brilliant, it is at least the most singular of terrestrial orchids. For gardens it is a rare curiosity, for botanists a perfect wonder, and an object of just pride for the enterprising cultivator who introduced it. The characters of the type may be stated in a few words:—It is a Cypripedium, the labellum of which, instead of being formed like a slipper, extends in that of a tongue, becoming narrow and extending downwards, like the other divisions, in the form of a narrow band. The sepals are of a yellowish white colour, the two inferior are joined together in one; about two inches long, and striated with greenish nerves. The petals (including the labellum) extend to at least a foot in length: they are pale, striated in face of their internal base, having a spot on the two posterior corners or horns of the depressed caruncle or protuberance which surmounts the gynostem or column.

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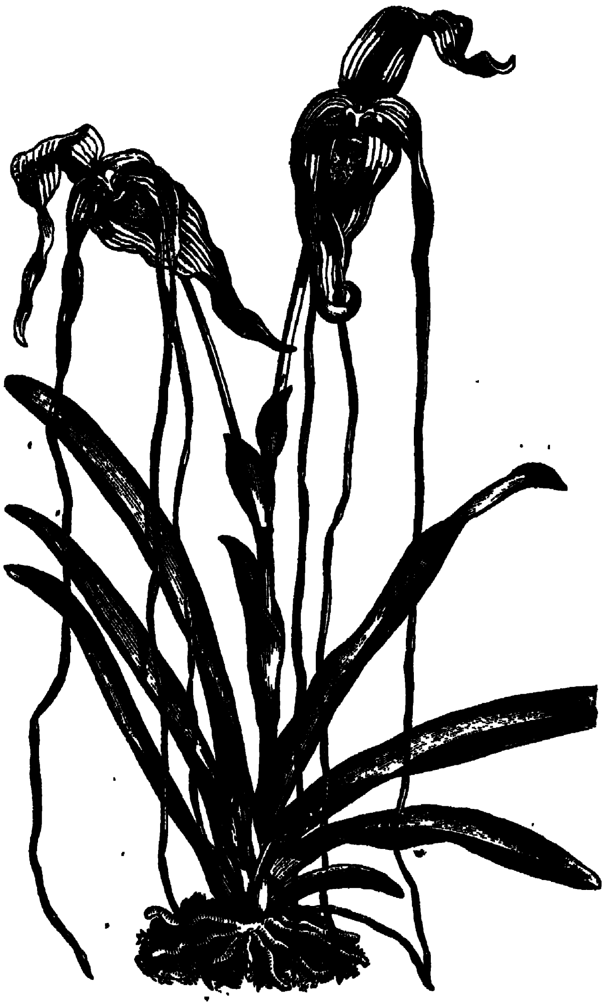
* By J. E. Planchon, Docteur en Sciences, &c. From the *Flore des Serres*.



This noble plant is a native of New Grenada, where Mr. Linden discovered it in 1843, in the territory of Chiguara, in the small woods of the Savannah, which rise on the Cordilleras to an altitude of 1650 metres, or fully 550 feet, and overlooking the vast forests of Maracaybo. It has been described by Dr. Lindley from a dried specimen; and has recently flowered for the first time in Europe, in the rich collection of M. Pescatore, at his Chateau, Cello, near St. Cloud.

It is worth while to consider for a moment one of the most curious examples of that law which is justly called the law of balance in the organs (of plants). According to a fundamental rule of symmetry in their flowers, orchids should have a verticil of three stamens, alternating with the interior parts of their perianth. Now, in consequence of a normal abortion with the generality of these plants, the posterior stamen exists only in a state of fertility; the two lateral ones having disappeared, or being only present in a state of sterile protuberance on the gynostem or columns. In the Cypripediums on the contrary (Cypripedium, Uropedium), the posterior anther is replaced by a fleshy caruncule, but to compensate for this, the two lateral anthers exist in a perfect state. If we add the one-stamened flower of an Orchid (Orchis), to the two-stamened flower of the Uropedium, we obtain the three-stamened flower of the ideal and symmetrical type of the Orchid family; and thus, in botanical arithmetic, as in ordinary calculations, two added to one make three.

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GARDEN UTENSILS.

[The annexed engraving represents some Belgian novelties of the class of garden utensils; and may perhaps be suggestive of some improvements in the mode of watering plants. The figures and descriptions are taken from *La Belgique Horticole*].

At the Agricultural Institute of Hohenheim, a new method of watering plants and gardens was brought into notice, and which, in German, is called, *Schnellgiesser*; in Flemish, *Schnelgieter*; and in French, *Arrosoir a la minute* (all three terms signifying, literally, *quick waterer*). Figure 1 shows this invention with the mode of applying it. It consists of a wooden tub, bound by hoops of iron, furnished at the top with iron handles, and in front with two stout leather straps, by which it is suspended from the back of the workman. At the bottom of the tub is a copper socket, to which a gutta percha or India-rubber pipe is attached, and at that part of this pipe, which may be conveniently held by the hand, there is a small turn-cock, and beyond this a spout and rose, the latter having the holes below. The tub contains as much water as the workman can carry, and when it is empty it is not taken off his back, but filled at the pump by a second person. The turn-cock enables the operator to stop or discharge the water at pleasure. By this contrivance a great saving of time and labour is effected. [Some adaptation of this idea might be useful].

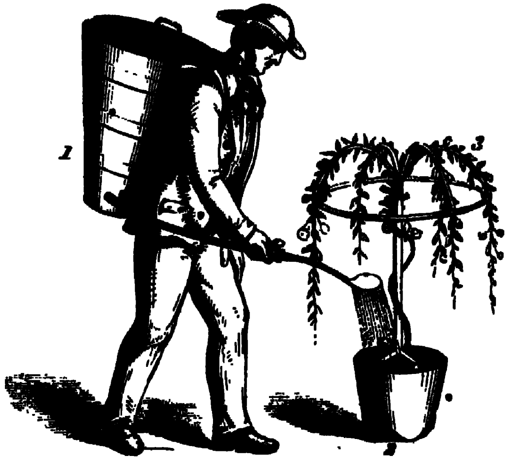

Figure 2 represents a new pot constructed to prevent worms entering at the hole in the bottom. In some gardens, where the earth is rich, the earth-worms are very troublesome, especially when the ground is damp. In these localities the worms crawl into the pots by means of the hole at the bottom, and if they commit little injury in the open ground, they are not so harmless among the roots confined in a pot. In order to obviate the evil arising from their intrusion, the new form of pot represented at figure 2, has been invented by M. Ghyselin, potter, at Brussels. The bottom is distinguished by having three feet, which are only prolongations of the pot. The bottom is thus raised above the ground, and the worms are thereby prevented from entering at the hole. This pot has also the advantage of facilitating the circulation of air, and preventing the stagnation of water. [Worms, however, do not always enter garden-pots through the drainage hole, but sometimes, especially in small pots, from the top. Against this the proposed form offers no safeguard. After all, the best plan is to take care on what foundation the pots are set].

Among the useful horticultural contrivances, may be noticed the iron trellis, represented at figure 3, which combines solidity, elegance, and lightness, qualities never found together in wooden trellises. The iron trellis, too, preserves all the forms or shapes which are given to it, and one may thus train plants in all the varied styles which are otherwise applicable. The form which is used has a circular head, like a parasol, consisting of four wires, which are bent and sustained in their position by three circles or hoops, the undermost considerably stouter than the others. The stem is supported at the base by three prongs, which are made so as to admit of being fixed in the ground or in a pot This form, when made from three to four feet high, produces a very good effect, when used to support such a plant as Calystegia pubescens, which looks remarkably well trained to this form of trellis. This same form may also be used in training climbing roses, in pots or in the open ground; their branches being led over the arches so as to cover the whole, present a mass of flowers in the summer time.

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PROFESSIONAL AND MORAL TRAINING.

Suggestive Hints Addressed to Young Gardeners.

By Mr. W. P. KEANE, Author of the "Beauties of Surrey."

NATURE proceeds by fixed laws; she is not a confused jumble of things—to-day one thing, to-morrow another. All the relations of the different parts of Nature are mutual and exact, and one thing moves on in a beautiful agreement with all other things. There is a reason for everything, and there is a rule by which everything is directed and controlled. It is not enough to say, "that there are mysteries in many of the operations of Nature which it is impossible for us to unravel." Although there may be many things beyond our comprehension, there is nothing which should be beyond our inquiry. The power always at work in vegetation is truly wonderful; the development and progress of vegetable life; the relations of the soil to the plant produced; the effects of light, heat, moisture, frost, and electricity; the nature of manures, their particular uses and results, may all be considered as mysteries at present in some measure unresolved. But from what we see in other parts of Nature which have been clearly revealed to our observation, it is but reasonable to conclude that what of these now appears mysterious to our unenlightened minds, is governed and regulated by laws as fixed and as certain as those which prevail in the other parts of the system of Nature with which we are acquainted. There is every reason to believe that the laws of vegetable and animal life, and growth, and nourishment, and decay, are equally well established, and equally invariable.

In explaining to you the principles upon which vegetation is based, I shall begin with the seed, which contains within itself the fructifying principle—a concentration of vital matter stored up in the smallest compass, to be acted upon by agents essential to the development of vegetable existence. The seed possesses the inherent principle of producing each to its kind. The vital principle in the seed (deprived of the agents necessary for vegetation) would lay dormant for ages; but allow these agents access to the seed, and a change is produced: the first impulse is given to vegetation. No one or two of these agents will effect the change—either singly or combined; the third must be admitted to contribute its share of the work. The three combined are all-powerful to produce a great change in the dormant seed. These three great agents are nothing more than a temperature above the freezing point of water, or 32° Fahrenheit; moisture; and atmospheric air.

While the seed remains dry, no change takes place in its texture; but when it is placed in a situation favourable for vegetating, it absorbs moisture, when the seed swells; the germ, or first embryo, is seen to increase in size, and ultimately to burst the cuticle or seed-covering; the radicle, or rootlets, descend into the soil for food, and to give stability to the growing plant; while the plumule shoots upwards to develope or expand itself in the air. Every seed of nutritious fruits or vegetables contains within itself starch, gluten, sugar, and albumen. Thus we find that the seed which before germination was nearly tasteless has acquired a sweetness, and is partly soluble in water (a portion of the starch having been converted into sugar), and the gluten and albumen have also undergone a change. The soluble parts of the seed consist of gum and sugar, which form but a small portion of the whole mass; the three remaining, gluten, starch, and albumen, are insoluble in cold water, hence the preservation of grain, and many garden crops.

To carry on the vegetative process when water is absorbed by the seed, it is necessary that it should also absorb oxygen from the atmosphere. I have stated that the presence of moisture is indispensably necessary for the germination of all seeds. How it acts is thus explained:—It is by the absorption of moisture into its texture that the starch and other constituents of the seed are converted into the proper nourishment best fitted to supply the embryo plant. Starch, gluten, and albumen are insoluble in cold water, but placed within the influence of oxygen, the principal constituent of the atmosphere—as seeds will neither germinate in carbonic acid gas nor in hydrogen nor nitrogen gas, nor in all combined—by the absorption of the oxygen gas from the atmosphere, a portion of the carbon of the starch in the seed is converted into carbonic acid. This combination produces heat—a provision of nature to forward the germination of the seed. An example of this effect is afforded in the heat evolved in the process of malting.

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THE CULTIVATION OF THE AMARYLLIS FAMILY.*

THOSE bulbous plants which are comprised in collections under the name of Amaryllis, may be grouped in sub-genera, or genera, very distinct as regards their cultivation, thus:—

Sternbergia (*S. lutea*).

May be grown in the open ground, and is not injured except in very severe winters.

Belladonna (*Amaryllis Belladonna*). Zephyranthes (*Am. advena, &c*). Strumaria (*Am. crispa, &c*).
Phycella (*Ph. ignea, &c*). Habranthus (*Am. pratensis, &c*). Nerine (*Am. curvifolia, &c*).

May be grown in the open ground, or in pits or frames *sheltered* from the cold. They may also be covered with hand-glasses; these as well as all other structures under which they are grown in the open ground, must be covered with mats or other protective material when the frost is intense. As soon as the weather becomes sufficiently fine, they may again be uncovered altogether.

N. B.—The Amaryllis (Zephyranthes) Atamasco, a native of Virginia, is the most hardy of the genus. It is, however, sometimes injured by frost when the winters are severe.

Vallota (*Am. purpurea*). Lycoris (*Am. aurea*). Brunsvigia (*B. Josephinæ, toxicaria, &c*).

Require a temperate greenhouse.

Hippeastrum (*Am. acuminata, aulica, calyptrata, equestris, fulgida, psittacina, reticulata, rutila, solandræflora, &c.*

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* By M. Louis Van Houtte, Nurseryman, Ghent. From the *Flore des Serres*.

These are species from the torrid zone, and require the following treatment,* which is equally applicable to their numerous cross-bred varieties:—

The bulbs must, during the time of rest, that is, during the three or four last months of the year, be kept very dry. They may be kept in the pots on a dry shelf in the stove. In January they are placed near the light, and where they may be free from drip. By-and-by, their scapes and leaves will commence to grow, when they must be slightly watered, gradually increasing the quantity. They will flower and ripen seed under this treatment, especially if the process of artificial fecundation has been carefully attended to, whether by means of their own pollen, or with that of some other species or variety. Success in the maturation of the seed depends on the following precautions:—Avoid changing the pot from its place; maintain the temperature at from 10° to 12° Reaumer [55° to 60° Fahrenheit], at the least, and never allow it to get below 8° Reaumer [50° Fahrenheit]; water moderately and always when necessary. The production of the seed never affects the health of the bulb, if these directions are carefully followed.

As for the plants which have not flowered, and those whose flowers have not borne fruit, it is advisable to place them in the month of May in a close frame, the lights of which should be opened by the middle of June, if at that time they may be watered by genial showers. The lights must then be kept off, except in the case of cold or rain. This treatment is only applicable to the healthy bulbs, and not to those that are weak or unpromising. These last must be preserved under glass all the summer, and shaded towards the middle of the day. Unhealthy plants are liable to be attacked by the coccus; and in order to free them from these insects which lodge between the scales, the bulb should be brushed with a soft brush, having a pointed handle, which may be used between the scales, as occasion may require, by which means the insects are dislodged. This operation repeated from time to time, is the best and safest mode of keeping the bulbs clear of the insects.

It is advisable to arrange the bulbs according to their state of advancement. Those which have attained the same uniform growth require the same treatment. On one side are placed those which are weak and not disposed to grow; on another those which are growing slowly, and must be excited; and so on. The most favourable time to re-pot the plants is when they attain to their strongest growth. This operation must be performed with the following precautions:—Take care not to break the ball, but take off about two inches of the surface soil, carefully clear and adjust the principal roots, and place a layer of new soil in the bottom of the pot. This soil should be composed of equal portions of loam and leaf mould, well mixed together; then place the bulb on the top, filling up the sides carefully with more soil, and press the whole gently down. A copious application of water should then be given to consolidate the soil and refresh the bulbs. After a slight syringing, place the plants in a frame which must be kept quite close for a few days, until a gentle shower falls, when the lights may be raised.

All the healthy plants must be treated in this way until the middle of August, when, if the weather is cold and cloudy, the lights must be kept on, and neither water nor shade applied to the plants. By this treatment they will rapidly attain maturation, and the leaves will become dry. At the latter stage the bulbs should be removed from the frames, and placed in the pots on the shelves of the stove.

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Miscellaneous Notices.

Light of Tropical Forests.—The forests of Essequibo, from which Mora excelsa projects to an altitude of 160 feet, has been traversed by Richard Schomburgk, who, after having vividly delineated the crowded growth of the trees, the climbing plants, and the creeping shrubs, which connect the stems in impenetrable meshes, and the parisites of the fallen trunks, dwells upon a point with which we are less familiar—the light of tropical forests. On the ground the eye would miss the splendour of the flowers of other regions, and detect only fungi, ferns, and decaying vegetable structures; for even at noon a subdued light prevails in the forests, since scarcely anywhere is a portion of the sky visible through the closely interlaced branches; but, although the light is subdued beneath so dense a covering of foliage, there is more light than in dark pine forests. Kittlitz comes to the same conclusion as to the remarkable, and, as yet, but little studied question, of how plants still thrive so well, and their green organs are able to respire in shaded parts of the most dense vegetation which the crust of the earth anywhere produces (*Vegetations-Ansichten.* p. 6). "I was astonished," writes he, "to find so much light beneath the noble trees, the widely-spread foliage of which scarcely anywhere allowed the sky to be seen. Remaining the same at the most varied times of the day, it could not be ascribed to the perpendicular light of noon, but only to those innumerable undulations of light, which, falling from above through the crowded masses of leaves in every direction, being reflected from stem to stem, and from branch to branch, finally reaching the lower space in the thicket, and there produce a tone of dull lustre peculiar to tropical nature. In fact, what would become of that whole world of plants destined to live in this shade, if nature had not given the huge masses of foliage, which produce it, a structure and distribution which permits it, although reflected a thousand times, still to reach in sufficient power the plants living beneath." This problem may be expressed more definitely as follows:—We have to explain why the shadows of obscure deciduous forests in the temperate zone are principally illuminated by transmitted, and in the tropics, by reflected light; and why the coniferous forests are poorer in these two luminous sources, and therefore, so frequently deprived of plants growing in the shade. We first think of the Mimosæ and forms of palms, of the compound, and, therefore, imperfectly shading forms of leaves, which thus contribute powerfully to the light tone of the tropical forests. But trees possessing this character form a part only, not the whole; for those forms with simple leaves, as the laurel and bombax type, preponderate in variety of form or size of the leaf. And even the form of the leaves of the Lauraceæ, which recurs in so many tropical families, is wanting in that transparent texture to which the light of the half-shaded parts of the northern deciduous forests is owing. But Kittlitz has pointed out another more universal character of the trees of tropical forests, in the arrangement of the leaves, which appears intended to complete the former. In climates where cold or aridity cause the winter sleep of woody plants, they develop a very much larger number of small branches, which usually form a more connected, although, on the whole, poorer stratum of leaves than in the tropics. This, therefore, throws a deeper shadow upon the ground, although it is more transparent, not so deep, however, as in the coniferous forests, the crowded leaves of which are opaque. On the other hand, it is evident that the uninterrupted heat and moisture of the equatorial climate also insure a longer duration of the first formed branches, many of which in the temperate zone fall off or remain undeveloped, and must, therefore, produce fresh ramifications to allow of the necessary number of leaves being formed; these first branches attracting the currents of sap, continue to grow excentrically, and hence leave between their uppermost tufts of leaves, *i.e.*, the youngest and softest part, more or less broad intervals. Under this double condition of the formation and distribution of the foliage, we may perceive universally in the latter climate "a certain and wholly peculiar permeability"—seen only in its simplest and most developed state in the palms—even in woody plants, which in other respects but little resemble the latter, and in which the more copious development of the ramifications of the stems produces this prevailing character, inasmuch as they imitate and replace the natural growth of the summit of palms. "Large masses of very delicate foliage in this manner obtain so light an aspect, that they appear, as it were, to float in the air; but even down to the smallest fern upon the soil, everything exhibits a tendency to an excentric distribution, which does not permit the separate organs to press upon one another, but by the constant crossing of lines in every direction, produces spaces for the transmission of air and light." Here nature addresses man like the noblest works of mediæval architecture, the pointed arches of which, of Arabian origin, have, it is supposed, borrowed that openness conjoined with gigantic masses, and infinite variety of form, from two palm stems, with their penniform leaves in contact.—*Ray Reports*, 1849.

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* Amaryllis (Hippeastrum) vittata is the only species that does not require the general treatment of Hippeastrum, experience having shown that it thrives best in a lower temperature than the others. This fact shows that the plant most likely comes from an extra-tropical region. Authors are not agreed as to its habitat; some are of opinion that it belongs to the Cape of Good Hope, but analogy seems to favour the probability that it is from America.

Plants Uniting the Qualities of Useful and Ornamental.—Considerable attention is bestowed, at the present day, on those useful plants which are capable of being used with ornamental effect, from the variety, the colour, and elegance of their foliage. The purple-leaved Atriplex, for instance, may always form an agreeable contrast with the green leaves of other plants. The yellow Beet, with red or rose-coloured stalks, would have a very fine effect from the prominence of its broad coloured veins. The Balsam Cucumber, certain species of Gourd, and Cucumis Citrullus, may be allowed to run over the ground, or may be trained gracefully to the trunks of old trees, or round arbours. Then there are many varieties of Cabbage, as the curly greenish, or red streaked laciniated sorts; all which, by the elegant forms and agreeable colours of their foliage, are admirably adapted for the purposes of decoration. The *Chou frisé panaché* (curly streaked Cabbage) is beautifully tinted with a delicate rose-colour. It is difficult to understand how these plants, which may be grown so easily, are not more generally used in country gardens, where they would produce, during a great part of the year, an effect as varied as agreeable. Such plants might be extensively employed in the general decoration of gardens and pleasure-grounds. A genus of plants which may be well recommended for this purpose, where there is ample space, is the Rhubarb, of which Rheum rhaponticum, Emodi, and palmatum, when grown in rich ground, present that luxuriance of vegetation which is principally characteristic of tropical plants. The Castor-oil, Ricinus communis, is another exceedingly characteristic plant, with its broad exotic-looking palmated leaves; the variety called minus is the best for ordinary gardens. These hints may serve to attract attention to the importance of plants of characteristic or striking foliage; equally important, in an ornamental point of view, with the brightest-coloured flowers, and much more conducive to general effect.—K.

Hybrid Forms.—In the *Thuringian Horticultural Gazette*, Professor Bernhardi, treating of Bastard forms, considers that the so-called bastard forms of the genus Gymnogramma (Ceropteris) might arise, not from impregnation, but from the coalescence of the roots with each other, because they germinate in hot-houses in numbers together. As an instance, he mentions a plant of Cytisus Adami, which was produced by grafting C. purpureus upon C. alpinus, whereby a hybrid was produced, which frequently assumed the characters of a bastard and often returned to its primitive conditions—at one time producing purple, at another yellow flowers. This is remarkable enough; and is the first instance of the formation of bastards in this manner.—*Ray Reports*, 1849.

THE JEFFERSON PLUM.

Prunus. *Nat order.* Rosaceæ.

FROM an account published in the first volume of the *Journal of the Horticultural Society*, it appears that this superb Plum was first brought into notice through Mr. James Barnet, in 1841, who procured it for his nursery in Edinburgh from Mr. Wilson, a nurseryman in New York. From Mr. Downing's "Fruits and Fruit Trees of America," it appears that the Jefferson Plum was raised by the late Judge Buel, and that the original tree was growing in his garden near Albany. Mr. Downing remarks—"If we were asked which we considered the most desirable and beautiful of dessert plums, we should undoubtedly give the name of this variety." As may be judged from the figure, it is certainly a most beautiful kind as to appearance, and excellent in quality; perhaps, under favourable circumstances, little inferior to the Green Gage, but, from the specimen we tasted, certainly not equal to our common favourite. Speaking of it Mr. Thompson remarks "no one can read the preceding statement from Mr. Downing without recollecting the well known excellence of the Green Gage, and questioning whether, in point of flavour, it can possibly be equalled by the variety under consideration. To say that the Green Gage under the most favourable circumstances for acquiring perfection would be surpassed, might prove an exaggeration. That remains to be determined. In the meantime it can be stated that in the past unfavourable season (1845), in which only there has been an opportunity for comparison, the Jefferson was found decidedly superior to the Green Gage."

Fruit, large oval; stalk, about an inch in length. Skin dark, remarkably speckled with purple and red, and suffused with a rich transparent bloom of cobalt blue. Flesh, deep orange, slightly adhering to the stone, juicy, rich, and sugary. Stone middle sized, elliptic. Ripe the end of August on walls, continuing on standards until the end of September, and will hang for a considerable time after it is quite ripe. Shoots smooth, or but partially or very slightly downy, of an upright growth. Leaves middle sized, elliptical, glabrous above, serrated or acutely crenulated.

For an opportunity of figuring this very admirable and excellent plum we are indebted to Mr. Brown, the very intelligent gardener to the Hon. Sidney Herbert, at Wilton House, near Salisbury, and who received his plants from Mr. Glendinning of the Chiswick Nursery. The tree being small and recently planted, only produced a few fruit, so that when the plants become thoroughly established, no doubt they will produce finer fruit even than that pourtrayed. It may certainly be regarded as one of the very best of plums; in fact as a prize in a class of fruit three parts of which are worthless. Fruit lists like plant lists require severely weeding, for it is worse than insanity for any person to grow more than ten kinds of plums; indeed, with the Jefferson, Green Gage, Coe's Golden Drop, Downton Imperatrice, Washington, and the Wine Sour for preserving, we should be quite satisfied; but on the subject of these long lists we shall have some remarks to make on a future occasion. The Jefferson Plum is a free growing and hardy kind, alike suitable to be grown against a wall or as a standard, and those who have convenience will not regret having planted it extensively.

Culture.—In point of cultivation the Plum, though more hardy, requires nearly the same treatment as that recommended in a preceding page for the Nectarine. The same general principles are applicable—a dry bottom, a good but not highly enriched loamy soil, and a border not exceeding three feet in depth. Under such circumstances a thorough ripening of the wood may be depended upon, and seasons being favourable, or protection adequate to the preservation of the blossom applied, a crop of fruit is certain. Those who have large trees of inferior kinds would do well to graft them with the Jefferson; by such means several years would be saved in the production of a crop. Plum Trees are very tractable plants, they may be removed almost of any size, or at any age, provided common pains are taken in their removal; and when the operation is properly performed, they will be benefited rather than injured thereby. The subject, however, of fruit-tree culture will shortly occupy the attention of one of our best gardeners, when their management will be explained in great detail.—A.

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Vegetable Physiology.

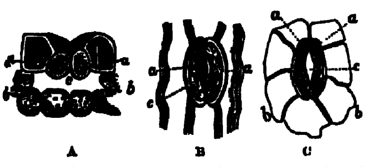
By ARTHUR HENFREY, Esq., F. L. S., Lecturer on Botany at St. George's Hospital.

THE EPIDERMUS, OR SKIN.

We have now examined sufficiently, for our purpose, the general character of the structures forming the chief part of the substantial and permanent organs of plants. The peculiarities of leaves and of the green herbaceous tissues forming the surface of young parts in general, has been but lightly dwelt on, since they possess a special kind of structure which has not yet been spoken of.

All parts of a plant are closed up and protected from the direct action of the atmosphere, by a layer of cellular tissue, having its own peculiar organization, and called the *epidermis*, or skin. The very lowest plants, indeed, those composed of mere layers or filaments of cellular tissue have, of course, no distinct epidermis; and even the leaves of the Mosses and allied tribes have none, since they are simply single or double layers of flattened cells, closely joined together, and may thus almost be compared with the epidermis of the more highly organized leaves, which consists of a similar layer of flattened cells, applied together closely, like the flag-stones of a pavement, and forming a coat or skin completely enveloping and protecting the loose, open, and irregular cellular tissue within.

This epidermis may be readily stripped off the leaves or green stalks of many plants, especially of the Monocotyledons, as for example, from the leaf of the Hyacinth or Iris, and then appears as an extremely thin, transparent, and colourless membrane, like a piece of very fine gold-beater's skin. When placed beneath a microscope this exhibits the tesselated appearance resulting from its cellular nature, and is found to be composed of a single layer or plate of very much flattened cells. The microscopic examination, however, reveals something more than this; we find numerous bodies of peculiar form interspersed among the cells, and a careful examination shows that these consist of pairs of somewhat kidney-shaped cells, much smaller than the rest, with a slit-like opening passing down between them, right through the membrane. These are the *stomates* or breathing pores, and are pairs of cells forming the borders of a mouth-like orifice, through which the air or gases may pass in or out, as may be required in the chemical changes going on in the spongy cells below.



A and *B*, stomates of the epidermis of the Iris. *A*, a perpendicular slice through a stomate, showing also a few of the loose cells, *b b*, beneath; *a a* are the two kidney-shaped cells bordering the slit *c*. *B*, a view of a stomate from above; the epidermis is composed of oblong cells, much larger than the stomate-cells, and only part of their walls in view. *C*, stomate and epidermis cells of an apple leaf; *a a*, cells of the stomate; *b b*, cells of the epidermis; *c*, the slit-like opening or breathing pore of the stomate.

A leaf of the kind just mentioned is composed of a quantity of irregularly formed cells, but loosely packed so as to leave large spaces between them, and containing green colouring matter and other substances in their interior. This spongy tissue is traversed by fibrous cells, here of the spiral vessel character, as may be seen by carefully breaking a Hyacinth leaf across and drawing the pieces asunder, when the elastic spiral fibres will be drawn out between the fractured ends. The fibrous bundles form the *veins* of the leaf. The whole is covered up by a complete sheath of epidermis or skin, giving the smooth even surface to the leaf. The stomates exist here both on the upper and under surface; generally they are most abundant beneath, excepting in leaves floating upon water, in which they are naturally all upon the upper exposed face.

Leaves of firmer texture, such as those of the Laurel or the Ivy, differ little in the essential nature of their structure; the veins are stronger, containing a certain amount of true wood-cells, but the principal difference in the consistence of the leaves depends upon the condition of the epidermis. The hard, firm, and often shining surface is produced by the thickening of the inside of the walls of the cells of the epidermis, which become thus partially filled up by deposits, not applied like those thickening the wood-cells, on all sides equally, but almost exclusively on the free side, next the external air; then, as the cells are close together, these outer walls combine to form a continuous, thickened, often leathery or horny covering over the outside of the leaf, which is now usually distinguished by the special name of the *cuticle*. The outside of the cuticle, exposed to the air, frequently undergoes a chemical change so as to be converted into a wax-like substance, or, as some suppose, this waxy matter is secreted through the cuticle, and solidifies as it exudes upon the outer surface. In the Grasses and Horse-tails, it becomes strengthened by a deposit of silica or flint.

In the thick fleshy leaves, such as those of the Ice-plants, the spongy substance of the leaf is much more abundant than in the flattened kinds; and according as the epidermis is more or less thickened by the formation of its cuticular layers, will the leaves be found soft and tender, as in many Mesembryanthemums, or tough and resisting as in the Aloes.

Similar differences in the epidermis give to leaves most of their prominent external characteristics. I have already said the general texture chiefly depends upon it; and not only is this the case, but what is called the *clothing* of leaves is a part of the epidermal system. Hairs are merely certain of the epidermal cells which have grown out into long filaments, and not unfrequently become subdivided so as to form jointed strings of cells, simple or branched. All the various gradations of clothing, from the slight hairiness to the dense felt-like covering, result from a varying degree of the elongation of the epidermal cells into hairs; for the felt is shown, like artificial felt, by the microscope, to be composed of a matted interlacement of hairs. The spiny points or prickles at the tips or on the teeth of leaves are merely epidermal cells developed into a woody condition; and what is called the *scabrous* condition of the surface is in like manner produced by a number of the epidermal cells growing out into little hard woody points. The innumerable other modifications that are met with will be readily understood from these few indications.

The more delicate leaf-like organs of plants, such as the petals, are of similar structure to the green leaves, only all is more delicate there. The epidermis is very tender, and often most elegant in its conformation; the sides of the cells being frequently waved, or toothed and dovetailed into one another. The glistening surface of many petals arises from the epidermal cells being each slightly swollen and protuberant, like a little dome, on the free surface, in a manner which may be roughly compared to the projections on the surface of a pebble pavement; and the velvet-like surface is a result of these outer sides growing out as exceedingly delicate hairs. None of the flat epidermal cells contain any colouring matter; and thus, by their smoothness and transparency, they act like a coat of varnish to the surface, giving the colours beneath their beautiful brilliancy and clearness.

The surface of all green parts, such as that of young shoots, leaf-stalks and the like, of fleshy leafless plants like the Cacti, &c., are all clothed by an epidermis like that of the leaves, and continuous with it, so as to form a perfect skin all over the green parts of the plants. The cellular tissue beneath is spongy, like that forming the *parenchyma* or internal substance of the leaves, and shares its active operations in the respiration and other processes of life.

As the stems of woody plants grow older they lose their green colour on the surface, and become brown and rough. This arises from the production of a new structure beneath the original epidermal cells, the cork-cells, which are usually squarish in form, thin-sided but strong, and contain no solid or fluid matter in their interior. Layer after layer of these is produced, till by their thickness they conceal the still green spongy tissue beneath, and as the plant grows older, first the original epidermal cells, then one after another layers of the cork-cells decay from the action of the atmosphere, so as to leave a rough surface, which is undergoing continual reparation by the formation of new cork-cells below. At least this is mostly the case. Sometimes, however, the decaying cork is not replaced, and the *liber* thus exposed to the air becomes affected in like manner, but is repaired continually below, as it wears off on the surface. This kind of growth gives rise to the stringy surface of certain stems, as, for example, of the Vine and the wild Clematis.

Little rough points may be noticed on the surface of shoots which are losing their green tint, or have already become brown. These are the bodies called *lenticels*, and consist of little blister-like disruptions of the cork-cells; the spongy layer beneath grows out a little, and the cork-cells give way before the pressure, so as to tear irregularly and leave little free spaces, by which air can make its way to and from the green cells beneath. These bodies are supposed to supply the place of the stomates here, as these do not exist in the corky layers.

The epidermis of the roots of plants differs remarkably from that of the parts exposed to the air by the absence of stomates, which are unnecessary here, and would only interrupt that continuity which is necessary to prevent the passage of any solid matter into the interior. It is very delicate upon all growing points, and may be regarded as a kind of filter through which the nutrient fluid passes. The tender hair-like fibres clothing the roots of certain plants (not the very fine branched extremities) are exactly similar to hairs in their nature; they are epidermal cells, which grow out from the general surface, and they decay and fall off as the root grows older and its epidermis tougher.

It may be mentioned, before concluding this part of the subject, that leaves growing beneath the surface of water, always thin and delicate in structure, are frequently filamentous and feathery, but even when flat and expanded have no stomates in their epidermis, which, with its thin outer walls, does not form such a barrier to the passage of gases or fluids, as the firmer epidermis of aërial organs.

A peculiar structure is noticed also in the aërial roots of the epiphytic Orchidaceæ. The cells about their delicate absorbing tips are strengthened and kept tense by slender spiral fibres loosely coiled up in their interior. Similar spiral fibres are sometimes met with in hairs, especially upon the epidermis of seeds, as on that of Collomia, Cobœa scandens, and many Acanthaceous plants. These cells are very elegant microscopic objects, and are very easily observed by scraping them off the surface of the seeds.

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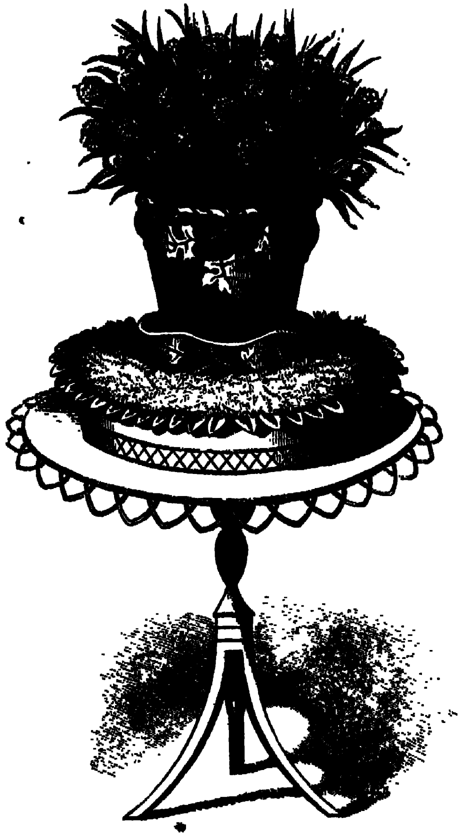
ORNAMENTAL FLOWER STAND.

PROFESSOR Morren, in *La Belgique Horticole*, has given the annexed form of Ornamental Flower Stand, which combines representations of a light iron table, a wire flower basket, and ornamental Belgian flower-pot of very neat design; and an example of one of the Dwarf Pinks of Verviers, referred to at p. 215. We give his description of these articles:—



Ornamental Flower Pots.—These are manufactured by Messrs Bosch, brothers of Hainaut, Belgium, and are well suited, from their ornamental character, for growing plants in rooms. They are ornamented with chaste designs, in relief, in imitation of different objects as well as flowers and foliage. The colours which harmonize best with the flowers are blended as well as possible. The pots which are to be preferred from their artistic value, are those which have a cinder grey, or slightly brown colour, with the designs of a light chocolate colour; that is, such as is produced when coffee is well mixed with milk. The figure represents such a pot placed on a bed of Lycopodium. [These pots, we believe, have been introduced to England.]

Wire Flower Baskets.—The trellis makers of Belgium construct the wire-baskets with a limb or border of leaves made of tin. The bottom is filled with soil, on a layer of chips of wood, and on this a beautiful green carpet of some of the dwarf Lycopodiums is grown and preserved in a fresh state all the year. When this Lycopod, which is so easily propagated by cuttings, has spread well out, and formed its branches in festoons, the effect is very pleasing. It may be grown thus in a few weeks in a situation which is warm and close, but not much exposed to the rays of the sun. Frequent waterings are necessary. In the middle of a bed of this moss may be placed one of the ornamented pots, containing some well grown plant.

Iron Table, or Stand.—The under part of the design represents a table made of cast-iron, and having an ornamental margin of wire. This article is solid, and, with the other accompaniments, forms a very ornamental object, and is otherwise not unfavourable to the growth of the plants placed on it, so long as the rays of the sun are not permitted to fall on it. This table is slightly and regularly inclined towards the centre, from which a pipe leads down the stock, and having a hole at the bottom for the escape of water. This mechanism permits ample drainage, and the water which falls in the operation of supplying the plants, empties into a vessel placed underneath the tripod. The design of the tables may be greatly varied. Those which are lightest are generally preferred. No parlour or drawing-room should be without such a stand as we have just described.

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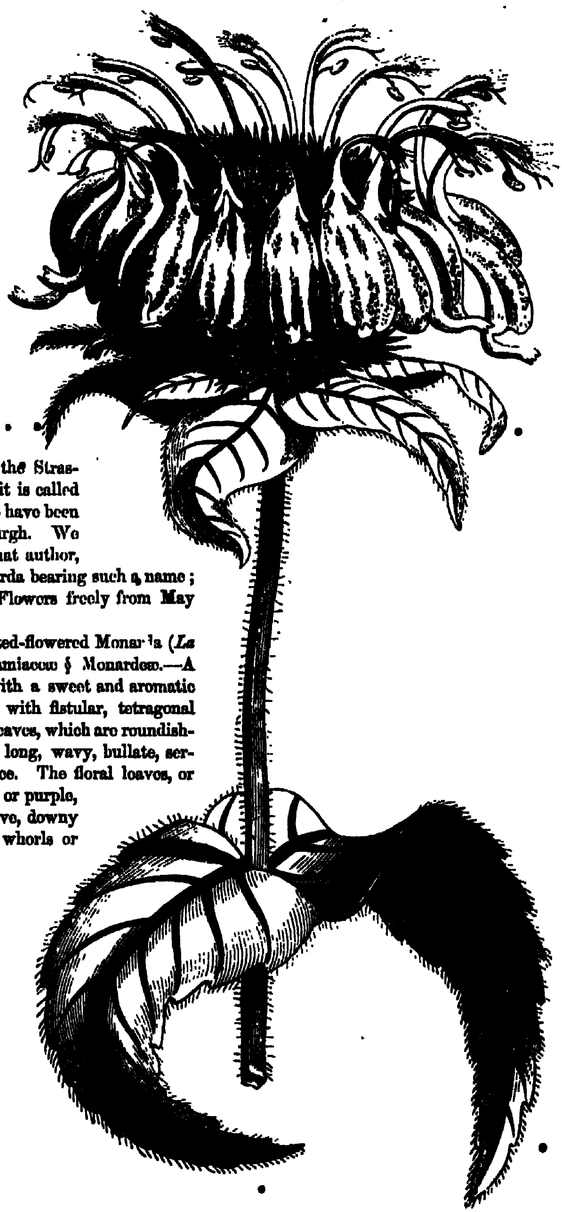
New and Rare Plants.

Monarda amplexicaulis, *Fischer* (Fée). Amplexicaul Monarda (*La Belg. Hort.*, i. t. 6., B).—Nat. Ord., Lamiaceæ § Monardeæ.—A very distinct and handsome hardy herbaceous perennial, growing about two feet high, with erect slender obtusely four-angled stems, having remarkably long internodes, and clothed with soft spreading hairs. The leaves are two to three inches long, subamplexicaul, acutely-lanceolate, subcordate at the base, serrated and fringed with white hairs; the upper leaves have the nerves and veins of a beautiful purple red, (shown black in our figure). The floral leaves are sessile, ovate-lanceolate, acuminate, ciliated, pale green, tinged with red on the paler centre. The verticillasters are large, solitary, somewhat depressed; the corollas very handsome, large, and freely produced, white, having a rosy tinge, and, on the lower lip, elegantly marked with four rows of purple spots. Native country not known. "For a number of years grown in the Botanic garden of Liege, and was raised from seeds obtained from M. Fée, director of the Strasburgh garden. In M. Fée's catalogue, it is called M. amplexicaulis, which name is stated to have been given to it by M. Fischer of St. Petersburgh. We have not, however, found it noticed by that author, and M. Fischer does not know any Monarda bearing such a name; but we retain it to avoid confusion." Flowers freely from May to July.

Monarda contorta, *Morren*. Twisted-flowered Monarda (*La Belg. Hort.* i., t. 6., A).—Nat. Ord., Lamiaceæ § Monardeæ.—A handsome hardy herbaceous perennial, with a sweet and aromatic odour, growing two to three feet high, with fistular, tetragonal stems, bearing opposite ovate lanceolate leaves, which are roundish-cordate at the base, four to five inches long, wavy, bullate, serrate, and covered with woolly pubescence. The floral leaves, or bracts, are narrower, of a reddish violet, or purple, becoming green at the tips, smooth above, downy beneath. The blossoms grow in false whorls or verticillasters, roundish, two or three on a stem, and have a red calyx, and a deep rose-purple two-lipped corolla, remarkable for the contortion of its parts, but more especially of the under lip. Near M. didyma, and M. fistulosa, but distinct from both. From North America: St. Louis. Introduced to Belgium in 1844, by M. De Barker, sen., of Anvers. Flowers from July to September. Botanic Garden, Liege.

Monarda albiflora, *Morren*. White flowered Monarda (*La Belg. Hort.* i., 40).—Nat. Ord., Lamiaceæ § Monardeæ.—A handsome hardy perennial, with slender stems, three to four feet high, erect, four-cornered, bearing lanceolate leaves, from four to six inches long, oblique at the base, and having a long narrow point, and serrated margins. The bracts or floral leaves, are long and acuminate, greenish white in the middle. The verticillasters globose, approximate, two or



Monarda amplexicaulis.

three on the stem; the flowers are wholly white, with greenish white calyces. It has the odour of the genus. From North America: St. Louis. Introduced to Belgium in 1844. Flowers in July and August. Botanic Garden, Liege.

Cordyline Sieboldii, var maculata, *Planchon*. Spotted leaved Siebold's Cordyline (*Flore des Serres* vi., 569).—Nat. Ord., Liliaceæ § Asparageæ.—Syn., Dracæna Sieboldii, *Planchon*.—A fine stove shrub, with slender simple or branching stems, five to seven feet high, numerously furnished in the upper parts with oblong deflexed leaves, four to six inches long, dark green on the upper surface, prettily marked with yellowish green blotches. The flowers grow in terminal or axillary slightly-branched panicles, and are greenish white, compared by Dr. Planchon, with those of a hyacinth. From Java. Introduced to the Belgian gardens by Dr. Von Siebold, about 1848. Flowers in summer. M. Van Houtte of Ghent.

Heracleum Wilhelmsæ, Fischer. Mad. Wilhelms' Heracleum. (*La Belg. Hort.*, i., 113). Nat. Ord., Apiaceæ § Peucedanidæ.—A large robust noble-habited hardy perennial growing from eight to ten feet high. The leaves grow to the height of three feet, and form a bold mass, as much, or more in diameter; the full grown leaves are pinnate, the earlier ones with a pair of leaflets or ternate; the lateral pinnæ are pinnatipartite, the intermediate one sessile, the lobes of all semi-lanceolate acuminate; they are lively green pubescent beneath, the robust petioles green. The stems are robust, terminating in a very large umbel of large white flowers, the petals at the circumference three times as large as those in the centre; the branches bear smaller umbels, and their subdivisions bear others which are smaller still; the anthers are black. The fruit is large, from five to seven lines long, without hairs. From Iberia. Introduced in 1849. Flowers in summer.

Phyllocactus caulorrhizus, *Lemaire*. Rooting-stemmed Phyllocactus. (*Le Jardin Fleuriste*, i., 6). Nat. Ord., Cactaceæ § Phyllanthidæ.—Syn., P. crenatus, of *some gardens*.—A fine succulent cool stove shrub, in some gardens confounded with P. crenatus. It has robust compressed oblong glaucescent subarticulate stems, crenated along the edges; at these crenatures, are produced, on the young stems, roundish scales larger than in the allied kinds; and numerous adventitious rootlets issue from the articulations. The flowers in general form, size, and colour, resemble those of *Cereus grandiflorus*; the exterior divisions of the perianth oblong, channelled, yellow, the inner oblong-obovate, their outer surface and margins yellow, inner surface white; the filaments slender, green, with yellowish white anthers; the style white, terminated by a ten-parted stellate white papillose stigma. The flowers, which only open towards evening and close the next day, have a faint and not very agreeable odour. Native country not stated: probably Honduras. Introduced (to Belgium) before 1848. Flowers in June.

Phyllocactus anguliger, *Lemaire*. Angular-margined Phyllocactus. (*Le Jardin Fleur.*, i., 6.) Nat. Ord., Cactaceæ § Phyllanthidæ.—A distinct-looking succulent cool stove shrub, of which it does not appear that the flowers are known. It has the general appearance of P. (Epiphyllum) Ackermanni, with numerous divaricating, very fleshy compressed branches, which are remarkable from the deeply angular form of the crenatures along their edges; the little scales usual on the young branches of these plants, are in this species wanting, and replaced by a simple opening of the epidermis where is formed an areole of short white wool intermixed with some setaceous spines. M. Lemaire's plant appears to have been received from the Horticultural Society of London; and is therefore, no doubt, the deeply-cut-stemmed Epiphyllum, found by Mr. Hartweg, inhabiting the trees of an oak forest near Matanejo in Mexico, in January 1846, whence it appears to have been sent to the Horticultural Society.

Freziera theoides, *Swartz*. Tea-leaved Freziera. (*Bot. Mag.*, t. 4546.) Nat. Ord., Ternströmiaceæ.—Syn., Eroteum theöides, *Swartz*.—A stove evergreen shrub or small tree, smooth in every part, with alternate elliptic-lanceolate serrated deep-green leathery leaves attached by short stalks, from the axils of which grow the creamy white solitary drooping flowers, an inch and a half across. The plant bears globose purple juicy berries, of the size of a small cherry. Remarkable for its near resemblance both in flowers and foliage, to the Black tea of China; its leaves are astringent and in taste resemble those of Green tea. From Jamaica: the higher mountains. Introduced in 1849 by Mr. N. Wilson of the Botanic Garden, Jamaica. Flowers in autumn. Royal Botanic Garden, Kew.

Allium acuminatum, *Hooker*. Acuminate-petalled Allium (*Part. Fl. Gard.*, i., t. 25).—Nat. Ord., Liliaceæ § Scilleæ.—A handsome, hardy, or half-hardy bulbous plant. Its stems grow about a foot high, furnished at the base with subulate rushy leaves as long as the scapes. The flowers grow in lax umbels, not bulbiferous, and have stalks very much longer than the spathe; the sepals and petals are erect, the three latter much smaller than the three former; they are recurved at the apex, which is sharp-pointed and richly-stained with crimson, while the lower half is colourless and semi-transparent. From California. Introduced in 1847, by Mr. Hartweg. Flowers in spring. Horticultural Society of London.

Polygonum cuspidatum, *Siebold and Zuccarini*. Cuspidate Polygonum (*Ann. de Gand.*, v. 461).—Nat. Ord., Polygonaceæ § Polygoneæ.—A hardy perennial herbaceous plant, with a creeping rhizome, and tall straight branching flexible stems, which are hollow and spotted with purple, and bear stalked, subcordate, broadly-oval cuspidate leaves, and axillary divaricately-branched panicles of small green flowers. Said to be handsome, from its massive leafy habit. From China. Introduced "a quarter of a century" since, and but recently recognized. Flowers in summer. Horticultural Society of London.

Cyclamen macropus, *Zuccarini*. Large-rooted Sowbread (*La Belg. Hort.*, i. 8).—Nat. Ord., Primulaceæ § Primuleæ.—A greenhouse perennial, with very large many-crowned fleshy roots as large "as an infant's head." The leaves are broad, cordate-oval, subangular, unequally crenate, veined and zoned with white. The flowers appear after the leaves have grown; they are large, the tube of the corolla globular rose-coloured, the segments of the limb white, oblong-obtuse, reflexed, an inch long; the stamens are subsessile, the style short exserted; these flowers are sweet-scented. From "the East;" discovered by M. de Schubert. Introduced to Europe about 1848. Flowers in winter.

Dalea argentea, *Martius*. Silver-leaved Dalea (*La Belg. Hort.*, i. 8).—Nat. Ord., Fabaceæ § Papilionaceæ-Psoraliceæ.—A small under shrub, growing to the height of a foot, with warty pubescent spreading branches, and compoundly pinnate (subquadrijugal) leaves of a brilliant silvery white, the leaflets obovate-oblong, retuse and subsessile. The flowers, which grow in dense terminal oblong heads, have the standard greenish yellow, the wings and keel being rose-coloured, and the anthers golden yellow. From Mexico: Miquiquana. Introduced to European gardens about 1848. Flowers in ? ———

Arhynchium labrosum, *Lindley*. Double-lipped Arhynchium (*Paxt. Fl. Gard.*, i. 142).—Nat. Ord., Orchidaceæ § Vandeæ-Sarcanthidæ.—An inconspicuous stove epiphyte, with the habit of a small Vanda, having distichous coriaceous leaves. The flowers are about an inch in diameter, and grow in racemes; the sepals and petals narrow blunt leathery purplish brown, spotted with dull yellow, the lip a hollow curved blunt horn, rising from the base of the column with its convexity upwards; on the convexity lies a flat, yellow, wrinkled, fleshy tongue, which seems as if it consisted of two layers. From Tropical Asia. Introduced about 1847. Flowers in October. Sir P. de Malpas G. Egerton, Bart., M.P.

Dendrobium transparens, *Wallich*. Transparent Dendrobe (*Paxt. Fl. Gard.*, i., t. 27).—Nat. Ord., Orchidaceæ § Malaxeæ-Dendrobidæ.—A beautiful and delicate stove epiphyte, ranking with the smaller-growing and free-blooming kinds. It has short erect tapering stems, ovate-lanceolate, obliquely emarginate leaves, and numerous large spreading flowers growing in pairs or threes, of a pale transparent pinkish-lilac, stained in the middle of the lip with a blotch of deep crimson; the sepals are linear-oblong; the petals broader, blunt; the lip acute, oblong, downy, with the sides erect, and rolled inwards. From the hills of Northern India, at 5300 feet elevation. Introduced in 1849. Flowers in summer." Messrs. Veitch of Exeter.

Chrysothemis aurantiaca, *Decaisne*. Orange-coloured Chrysothemis (*Revue Hort.*, iv. 381).—Nat. Ord., Gesneraceæ § Gesnereæ.—A stout herbaceous stove plant, having fleshy stems, growing two feet high, and clothed with large opposite oval-elliptic acuminate leaves, which are crenulate, bullated, and covered on both sides with short hairs. The flowers grow in cymes of three on peduncles, which come from the axils of the upper leaves; the pedicles purplish; the calyx with cinnabar-coloured unequally-toothed segments; and the corolla slightly two-lipped, the tube exceeding the calyx; the limb of five rounded segments, bright yellow, with dotted lines of carmine on the face, velvety outside, glabrous within. From the Antilles. Introduced to the French gardens in ? Flowers from August to the end of October.

Amaryllis lateritia, *Dietrich*. Brick-red Amaryllis (*Algem. Gartenseit*).—Nat. Ord., Amaryllidaceæ § Amarylleæ.—A showy stove bulb, apparently intermediate between Vallota and Amaryllis. The leaves are between strap-shaped and lanceolate, and succeed the flowers. The scape grows two feet high, and is two-flowered; the flowers are about three inches long, red, the segments spreading, but combined into a curved funnel-shaped tube, which is destitute of appendages in the throat; the outer divisions are broadest. From Guinea. Introduced to Berlin by M. Decker, about 1848. Flowers ?

Hippeastrum (Amaryllis) **robustum**, *Dietrich*. Robust Hippeastrum (*Allgem. Gartenseit*).—Nat. Ord., Amaryllidaceæ § Amarylleæ.—A showy stove bulb, nearly related to A. aulica. The leaves are long strap-shaped, not glaucous. The scape glaucous nearly three feet high. The flowers are in pairs, erect, between bell-shaped and funnel-shaped, five inches long, the divisions separated to the base, the exterior ones lanceolate, with a callous-hooded point; the interior oblong-acute; the colour is deep carmine red, the short cup-shaped coronet quite green. From Brazil. Introduced to Berlin by M. Decker, about 1848. Flowers ?

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ON THE PRODUCTION OF EFFECT IN LANDSCAPE AND GARDEN SCENERY.

By Mr. JOHN COX, Gardener to W. Wells, Esq., Redleaf.

IN the higher branches of the art of Gardening, or such as require the application of a well-educated taste, the production of effect may be considered as the great desideratum to which the efforts of the designer should be directed. It matters not what are the means employed, or the particular parts operated upon, the end is obvious—viz., to produce an appearance which shall strike the observer; and in proportion to the skill and taste employed, so will the effect be pleasing to the eye by its beauty, agreeable to the taste by its consistency, and striking to the imagination by its novelty and judicious contrasts; or, otherwise, formal, commonplace, and unnoticeable.

Many good remarks bearing on this subject have from time to time appeared in the *Gardener's Magazine of Botany*; but it appears to me to be one deserving of greater consideration—indeed, of so much importance as to be worthy of having especial attention drawn to it: for it is undoubtedly the leading idea which should occupy the attention of the designer and improver, whether of Landscape, Lawn, or Flower-garden scenery. It is also applicable to the arrangement of plants in conservatories, or wherever their agency is employed for decorative purposes.

The subject is far too comprehensive to be adequately treated of within the limits of an article of this nature; nor is it at all probable that each important particular would occur to the individual. I therefore cannot hope to do more than endeavour to draw attention to the subject by adducing a few of the primary considerations which would naturally occur to any one about to institute an inquiry into the principles of the art—and to the study of these principles gardeners must turn their attention; for as there is an immense increase in the mass of materials, the characteristics of many of which are just beginning to develope themselves, so also has the interest excited by these things caused a corresponding increase of taste, or would-be taste; and therefore it may be said to be a duty imperative on gardeners, both for their own advancement and that of their profession, to be the first to discover and appreciate the way in which this increase of materials may be turned to the best advantage. Chance medley-work will not do now-a-days; the oft-beaten track must be deviated from, and new lights opened before us, if we would keep pace with the onward movements which every thing around us is making.

It seems to me, that at the outset of an enquiry of this kind, we should endeavour to obtain a clear conception of what we should understand by the word "effect." The common definition, viz., "that which is produced by an operating cause," is perfectly correct, but does not appear to me comprehensive enough to express its relation to gardening operations. Effect may be said, in one instance, to be the evidence of design; in another, the result of the application of skill and taste in the disposition of the several parts by which it is produced; or, in another, the impression made on the mind through the eye by certain arrangements of flowers, shrubs, or trees, arising from the association of ideas which they excite, or their own peculiar appropriateness to the situations in which they are placed.

And again, effects themselves are as various as the means employed to produce them. Thus we say, a grand effect, a pleasing effect, a sombre effect, or a graceful, or striking, or gorgeous effect, *cum multis aliis;* but in each and in all, I believe that wherever found they are clearly definable, and that their presence depends upon certain rules of the art, which time and enquiries of this kind may bring to greater perfection. Many persons, in an off-hand way, pooh! pooh! the idea of being fettered by rules of any kind, and trust rather to the inspiration of what they call genius, or the promptings of the moment. All a fallacy! Rules never fetter true genius. On the contrary, some of the finest productions of genius exemplify the most rigid adherence to rules. There have been instances, it is true, where genius has broken through one set of rules, but only to substitute others. But, leaving genius to shift for itself, I will further observe, that it is one very necessary duty, on the part of professors of gardening, to accustom themselves to observe with the greatest attention such effects as may appear to them striking, in order to discover why they are so; and also how far they may be capable of being adapted to other designs and situations. The importance of this being allowed, and I cannot see any reason why it should not, it is still more so that it should be rightly applied, for each varied effect, may be said to have an individuality peculiar to itself. Yet it is not an unworthy enquiry to endeavour to ascertain in what way any portion of them may be applied so as to harmonize in combination.

It may be said to hold good as a general rule, that two extreme *styles* do not harmonize together but as the affinity of effects for each other is greater than that of distinct styles, we may conclude that there are arrangements by which various effects may be produced in the same design without at all interfering with its harmony; but it is not so with various styles. Every one who lays claim to a knowledge of the principles which should influence them in the designing and choice of the decorations and arrangements of garden scenery, ought to know that consistency is one of the fundamental rules of the art, by which is meant that those subjects only should be employed which are entirely appropriate to the design in which they are placed. As an example of the idea I would convey by these remarks, I will suppose that an elegant classical vase, elaborately ornamented, is placed amongst a mass of natural rockwork, without one other mark of the hand of man to keep it in countenance. Would not a critic exclaim, "What bad taste!" But let it be placed on an architectural terrace, accompanied by other classical embellishments, and it becomes at once a beautiful and appropriate ornament, in perfect keeping with surrounding objects. From this arises the important deduction, that contrast, however desirable, must not be sacrificed to consistency. In a great extent of ground, many distinct styles may be admitted, but must be skilfully separated from each other; but in a small space it is better to fix on one style, and adhere to it by admitting nothing which does not perfectly accord with the ideas which such a design is supposed to excite.

In these desultory remarks I have not even passed the threshold of the inquiry, so fraught is it with considerations of importance to the development of the principles of true taste; but my present object will have been attained if I have succeeded in awakening that interest which the subject deserves.

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NEW PERENNIAL PHLOXES.

Nat. Order.—POLEMONIACEÆ.

GENERIC CHARACTER.—Phlox, *Linnæus.*—*Calyx* campanulate, prismatic, five toothed. *Corolla* hypogynous, funnel-shaped, tube long, limb five-parted. *Stamens* five, inserted in the middle of the tube of the corolla, included; of unequal length. *Ovary* ovate, three-celled. *Ovules* solitary in the cells; ascending from the base of the central angle, anatropous. *Style* terminal, simple; *stigma* trifid, *Capsule* ovate, three-celled, or by abortion one- or two-celled, loculicidally three-valved, valves separating from a septiferous column, *Seeds* solitary in the cells, erect from the base, plano-convex.—Perennial herbs, sometimes under-shrubs, erect or prostrate, common in North America; rare in Northern Asia; lower leaves opposite, upper alternate, sessile, quite entire, flowers terminal, panicled or corymbose, lilac or rose-coloured, rarely red, blue or white.—(*Endlicher, Gen. Plant.* 3819.)

The varieties figured on the opposite plate are cross-bred garden forms obtained through several generations; the original parents having been P. suffruticosa and P. suaveolens.

GARDEN VARIETIES:—

1. *P. Abd-el Medschid Khan.*—Flowers large almost exactly circular, creamy white with a delicate pink eye. A free blooming and very fine variety.
2. *P. Paul et Virginie.*—Flowers of good form, deep rosy lilac. Blooms freely in large heads.
3. *P. Madame Viard.*—Flowers blush-white, with a central star of rosy lilac. A free bloomer and very pretty.

DESCRIPTION.—Showy hardy herbaceous perennial herbs, with fibrous roots and erect stems, bearing dark green leaves, ovate-oblong, more or less elongated, acuminate at the apex, often cordate at the base. The flowers are arranged in fastigiate pyramidal branched panicles terminating the stems, the branches much subdivided; the flowers numerous, crowded, very showy. The variety Abd-el Medschid Khan is one of the finest that have yet been raised, as regards the size and perfection of its blossoms, which often measure larger than a half-crown piece, and are of exquisite form. It is a free grower, a foot or rather more in height, blooming abundantly and very early, that is, in June and July. Paul et Virginie is also an early bloomer, producing large heads of finely-shaped middle sized rosy blossoms. Madame Viard grows rather more than a foot high, and this too has large well-formed blossoms of a blush white, prettily marked with rosy lilac at the base of the divisions of the limb of the corolla the markings forming a ray of five stars around the eye.

HISTORY, &c.—For the accompanying figures we are indebted to Mr. John Salter, F.H.S. of the Versailles Nursery, Hammersmith, by whom these and many other fine Phloxes are introduced to the English cultivators. They were raised in Germany, and Mr. Salter has obligingly furnished the following particulars of their origin:—"Of the Phloxes I have two divisions, the one consisting of varieties raised from cross-bred forms obtained from hybrids (originally produced in Belgium and Germany about twenty years since) between P. suffruticosa and P. suaveolens; the other, of varieties raised in the same way from hybrids between P. decussata and P. omniflora or suaveolens. The former grow from twelve to twenty inches high, and bloom very early (June and July) and not unfrequently a second time in September and October; the colours are varied, and very beautiful. They require a light soil and a warm situation. The varieties of the latter division grow from twelve to twenty-four inches high, and have large heads of flowers, which are white, pink, rose-colour, and sometimes mottled or striped; they have an agreeable odour, and bloom from August till November. They are perfectly hardy, and like a light loamy soil."—M.

PROPERTIES OF THE PHLOX.

BY MR. G. GLENNY, F.H.S.

THIS is one of those windmill kind of flowers, which naturally look poor and weedy, but which should be in almost every respect of an opposite character. The following are the principal points to be kept in view in attempting their improvement:—

1. Every individual bloom should be perfectly round and flat, without notch, division, or serrature.

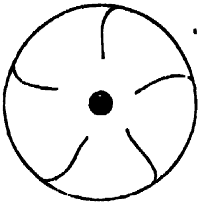
2. The corolla should be thick, and smooth.

3. The individual flowers should, by their number, form a good head or truss, touching each other, rising in the centre, and not confused.

4. The colour should be dense, and pure; if white, or yellow, or straw, or cream colour, it should be decided, and all over alike; if striped or spotted, the marking should be uniform and well defined.

5. The individual blooms should be large, and the truss proportionably so; though size counts for nothing if the other properties are deficient.

6. The plant should be dwarf, and branching; and the flowers numerous, so as to cover it completely when it blooms.


A PERFECT PHLOX.

The Phloxes constitute a very numerous family, very much varied in their habits, colour, and general nature; they comprise perennials and annuals. Of the latter, there is nothing more beautiful than *Phlox Drummondii*, whether we look to its colour or habit; in a pinch of seed there will be many shades of colour—some very nearly scarlet. The perennial kinds spread very much in the ground, and are easily propagated by parting the roots; new varieties may be raised from seed. The month of August affords the best opportunity of selecting such varieties as are likely to lead to improvement; some are very dwarf, very pretty, and in many respects approaching the standard here laid down. To pick out a few of the best of them, of different colours, and cultivate them close together for the purpose of saving seed, would be a task worth any one's undertaking, because the flower is by no means an unimportant one in the season of its bloom, and greatly assists the variety of a well kept flower garden. The *Phlox Drummondii*, which may be procured now of nearly a bright scarlet, should be one among the number selected for breeding from, though it is an annual; but of course it should be used for crossing with, and not for seeding.

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THE CULTIVATION OF ROSES IN POTS.—SECOND SEASON, &c.

By Mr. J. Saul, Durdham Down Nursery, Bristol.

I PREFER potting in this way:—Having placed my compost on the potting-board, I procure a quantity of turfs as they are brought in from the field, and very rough pretty dry well decomposed cow-dung. The pots being drained, and on the potting-board, I tear off one or two large pieces of the turf, and put it into the bottom of the pot on the drainage, top downwards. In general this will be of sufficient height for the ball of the plant to rest upon; if not quite high enough, I put in a little of the mixed material (p. 192) to raise it to the required height; next, tear off pieces of turf, six or seven inches long, and two or three wide, and as many thick; about four such pieces should be crammed in between the ball and the side of the pots perpendicularly; between this, place large pieces of rough cow-dung, nearly equivalent in bulk to the size of the loam, and fill up all crevices and cavities with the mixed compost, finishing off with the same, and making the whole quite firm. During the operations, care is required not to leave any cavities between the mould and pot, but to fill all up compactly. This is to be the treatment of the strong growing varieties. The Teas, Chinas, &c., may be potted in a similar way, except leaving out a portion of the rough cow-dung, and using more of the mixed material in its place.

This manner of potting may appear strange to some; but if such persons will give the after treatment, I shall now describe the beauty of the plants in the following season will be to them equally novel. The great use of this rough potting during the following season of growth, will be apparent, allowing, as it will, water, whether soft, or liquid manure, to pass freely through, and the air to act upon the roots.

The plants ought now (September) to be properly trained—those intended for climbers, such as the Hybrid Chinas, Hybrid Bourbons, and strong growing Noisettes, round neat stakes, three to four feet high. If these had been thinned during the previous summer, they will now require little or no pruning, but merely to have their branches tied neatly and regularly round, shortening the extreme points. Any very strong growing perpetual or other summer Roses, may be trained in a pyramidal form, by placing stakes round the side of the pots, and making them meet at from two to two and a half feet high, passing a hoop round them at about a foot and a half from the pot; the branches must be tied down to the rim of the pot, and round the stakes up to the summit, bearing in mind to keep the branches well down, as there will be no difficulty in filling up the top the following spring. These, like the others, do not require much pruning; thinning out where crowded, shortening where too long, and regulating the branches, will be enough. This applies also to the less robust Hybrid Perpetuals, Bourbons, Chinas, Teas, &c.; the plants being all young, the wood thinned out and stopped when necessary, during the previous summer, they only require to be properly trained, with a little shortening. All the classes I am now speaking of, are best suited for bush Roses, and in training, the branches must be tied well down to the rim of the pot all round; any branches in the centre of the plant can be tied down to the lowest branches; but not in too close or crowded a manner. I am aware some first-rate growers recommend pruning many of these hard in, at this stage of growth; in this I can see no advantage, as the plants, under proper treatment, will be full of young wood, and to prune them hard would spoil the bloom. All that I find necessary, is to thin out, where over-crowded; to shorten where too long; and to properly regulate and tie out the branches.

The plants will now require to be placed in their winter habitation, and nothing is better than a cold pit facing the south, the lights being at a very acute angle, in order to catch every ray of light and sun. Let the plants be placed upon inverted pots, as close to the glass as possible, keeping the delicate varieties, as the Teas, Chinas, &c., at one end by themselves. Leave the lights off, night and day, during autumn, except in case of rains, from which they must be scrupulously protected. During the winter the lights must be off all day in settled weather, and tilted up by night to allow a circulation of air among the plants, shutting close only in case of very severe frosts, and wet; slight frosts are not injurious. Through the winter they require little or no water. I have had them a month or two without a drop, and it should be given only when the mould is very dry; the great point of winter treatment being to protect the plants from rain, to give very little water, and to allow them abundance of air.

About the end of February, many of the Perpetuals, Bourbons, Chinas, Teas, &c., will commence growing, and the slight protection which they have will facilitate this. About this time they should receive a surfacing of rotten cow-dung, from one and a half to two inches in depth, taking out a portion of the mould to make room for it, particularly by the rim of the pot. If it is desired to have a portion of the plants in bloom early, the end of February is an excellent time to remove them into a warm greenhouse—a span-roofed house is the best; and here the plants will progress rapidly, and come early into bloom. But I will leave this structure, and return to their present quarters, and bloom them there. As the plants progress in growth they must be frequently looked over, tying the lower branches of all down to the rim of the pot, and the other branches of the Dwarf Roses neatly and regularly down to them, but not leaving the centre open or bare. The pyramidal plants should be trained regularly from the rims round the sticks to the summit, and the climbers in a similar way; they should also be turned round in the pit once or twice a-week, that they may not get one-sided. Through the spring, while the plants are growing (particularly in March and April), air must be regulated with caution; the young shoots being extremely soft, the cold harsh winds of March would be very injurious to them, and from these they must be protected, giving air at that side of the pit from which the wind cannot beat upon the plants. By night they should be shut close to avoid spring frosts—these slight frosts being more injurious when the plants are so far advanced than 12° to 15° would be in the depth of winter. I have even found it necessary to well mat the pit where the Teas and Chinas were, in March, when severe frosts were expected, and the plants appeared liable to be frozen—a thing not unfrequent at that season. Alternations of the weather in spring are very injurious to delicate Roses; and, from the effect of a little frost at that season, I have seen large branches and whole plants of Tea Roses die off: hence the great care necessary to protect them from frost and cold. At the same time, no opportunity should be lost of removing the lights from the whole collection every fine day, and for as long a time as possible, that the shoots may not be weak or drawn; they should be exposed to all the light, and to soft rains, which are very beneficial; protecting them from cold or heavy rains.

By the middle of April all danger from severe night frosts being past, they should have air all the night, by tilting up the lights at the back, and keeping the lights off as much as possible by day; following this up to the middle of May, when many will be coming into bloom. By the beginning of May the pots may be removed from under the plants, and they set on the bottom of the pit, provided it is not too far from the glass—not more than nine inches. From the end of April to the end of May, and later, till the blooming of the last plants, the pit should be sprinkled every fine day, morning and evening, around the sides, on the ground, and over the foliage of the plants, until the blooms begin to open, when it should be discontinued; it should be performed with a very fine rose-pot, or a syringe. The foliage, under this treatment, will be remarkably clean and healthy. In wet or cold weather this must not be performed, as mildew would be the inevitable consequence. After my plants had been top-dressed in the spring, and when commencing growth, they received a watering of liquid manure. Such waterings are not necessary to be repeated before the end of three weeks; and after that once a-fortnight, will be often enough, until about the middle of May, sooner or later, according to the weather and the forwardness of the plants. About that time we may expect the buds to be swelling, and the liquid manure may be given once a-week, and continued through their blooming; when given, the plants should have a good soaking, and at all intervening times from the commencement of their growth in early spring to the end of their blooming, soft water must be used.

All strong watery shoots, as they make their appearance, should have their extreme point pinched out when six inches long, and through the whole season of growth continual attention is necessary to tying, training, and taking off the suckers of worked plants as soon as they appear. From the commencement of their growth to the end of the blooming time, as soon as the least sign of green fly is visible, they must be fumigated. Caterpillars in the leaves and buds during growth should also be looked closely after. If the weather is fine about the middle of May, a little shade may be given for a few hours each day, with thin gauze, as the buds by this time will be swelling. On the opening of the blossoms the plants should be moved into a cold north house, and kept rather close and shaded, where they will bloom finely; a cold pit, facing the north, will answer the same purpose, but in this situation they cannot be seen to advantage.

ROSE: COUP D'HEBE.

The Roses having bloomed, all dead flowers should be cut off, and the plants placed back in the pit from whence they were taken; here they may have plenty of air and light, and may remain until they have perfected their growth, during which time they may have liquid manure about once a-fortnight. After completing their growth, let them be placed out-doors in an open airy situation. Any straggling blooms or suckers that may be produced, being cut off. The plants may remain out of doors until the end of September, when they will require fresh potting; this may be performed in the same way as the potting in the preceding season, except that the balls may be reduced a little more, and the plants being old will require a portion of the old wood to be cut out, and the young wood shortened, thinned, tied down, and trained as before.

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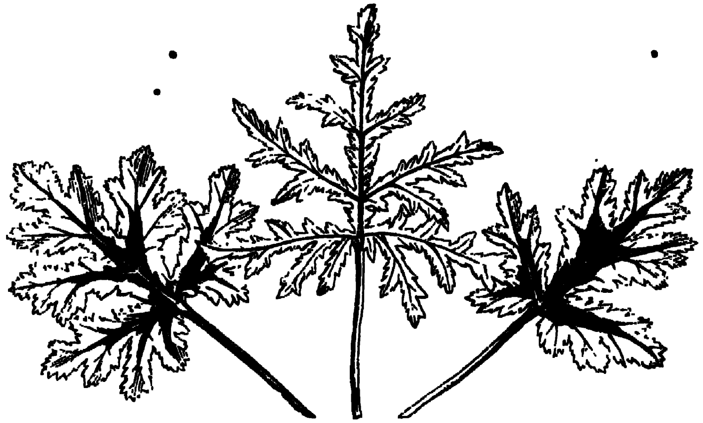
PELARGONIUMS.—HINTS TO CROSS BREEDERS.

By Mr. H. Rosier, Brooklands Nursery, Blackheath.

WHERE is there a plant so universally admired or generally cultivated as the Pelargonium; or, when we consider its merits for decoration or purposes of exhibition, so justly entitled to a place in every collection? What would our great annual exhibitions be without them, where their brilliant flowers and fine foliage make a great display? But, notwithstanding this, if we may judge by the prizes offered, they are losing ground in the estimation of the managers of one of the leading exhibitions for next season. It will be said they are deteriorating in quality, or that the breeders are not producing varieties fit to compete with those of former seasons; and perhaps, to some extent, this may be true, for the improvements in this class of flowers have not been so great within the last year or two as we could wish, or as they ought to have been. Certainly there has been a few which have exemplified a little improvement in form, but new colours generally are wanting, and I may add, in many instances, good habits too are much desiderated. Fine habit appears too frequently to have been overlooked by the breeders, and the great aim, if we may judge by the productions of the last two or three years, has been scarlets and crimsons, and other high colours, while little or no attention has been paid to light or white ones—of which, at the present time, our collections (as far as the exhibitions show them) appear to be wanting—to prevent that sameness of colour which now prevails. A robust and stocky habit we think a great, if not the greatest feature in a Pelargonium. Next let them bloom freely, not only producing abundance of flowers, but trusses individually large, for though some of the seedlings of the last few years have been rich coloured, and the form of individual flowers exquisitely beautiful, they have been far too shy in producing them, and hence, to some extent, the reason of old kinds taking the prizes in classes where new and first-rate varieties ought only to compete. It is true that some of the best raisers have not been represented by the cultivators of new kinds, and so long as they can take the prizes without buying the new varieties, we can scarcely blame them for doing so. This, however, is a matter which the censors *must look to.* Next season we hope to see some of the new flowers, raised by different growers, exhibited in the stands, where we may judge of their merits, and that the prizes will be given to new ones if they deserve it, though the plants are not so large as some which have been in the hands of the growers for years.

In the Fancy class of Pelargoniums great improvements have been made, and, to use the words of one of our best judges of florists' flowers, "they will arrive at perfection long before the show varieties;" and we doubt not that, from their close habits and profuse manner of producing their pretty painted flowers, they will long and deservedly continue favourites with the public. A fine field is here opened to the florist to try his skill in hybridizing and producing an endless variety of colours and curious foliage; for, though the raisers of show varieties have not achieved much as to diversity of foliage and elegance of habit, we have reason to believe, that breeders in the fancy class, by crossing with some of the old oak-leaved varieties, or Cape species, may produce a race of fancy foliaged varieties almost as varied and elegant as the flowers themselves. We do not speak doubtingly on this subject, for already we have sweet foliage with fancy flowers, and the annexed engraving, representing the foliage of three varieties, selected from a number of seedlings, raised between Anais and a Cape species, shows what has already been done, and from the same parents, and the same seed-pot, we have, at the least, six more equally distinct and elegant classes of foliage; let it be remembered, too, this foliage is all sweet, and if Anais and one species gives so much variety of character what reason is there why the fancy flowers and other Cape species should not exhibit similar diversity? It is true we have not bloomed these plants, but we live in hopes, that before the "world's holiday" closes, in July next, we shall be able to show that our experiment has not been "labour lost;" and if the plants are fertile, we doubt not in the third generation we shall have good flowers as a prize for breeding.


EXAMPLES OF NEW FANCY-FOLIAGED PELARGONIUMS.

What might be done for the flower-garden by judicious crossing with many of our old bedding varieties? For instance, Anais impregnated with Quercifolium superbum, a brilliant scarlet, with pretty oak leaves; or Fair Helen, a pretty light oak-leaved variety, impregnated with some of the brightest colours in the fancy class, such as Fairy Queen, Formosissimum, and Formosa. For shape and colour those with broad petals must be selected for this purpose, as the broader the petals the greater the surface to show the colour. Again, what endless and curious varieties may be obtained by crossing them with the Cape Pelargoniums, which would give in part their beautiful rich colour, and many their palm-like leaves? In hybridizing these two classes, great care must be taken in the selection of parents. Where colour is the object aimed at, take some of the highest coloured and best formed in the fancy class. Anais and Jehu, though old, are good breeders; Fulgidum, with its brilliant scarlet flowers, would make a good male parent, for many of the fancies, if judiciously crossed; Bipinnatifidum and Quinquevulnerum would do much for fancy foliage; and Citriodorum, with many others of the Cape species, would lend their perfume. That these will cross with the fancy varieties I feel confident, from the fact that a year or two back I obtained a cross between Anais and Campylea laciniata, which proved a beautiful little plant, appearing at a first glance more like a small Indian Pink than a Pelargonium. It has also very singular palmate leaves, partaking in a great measure of its male parent Campylea laciniata. This plant obtained a medal from Dr. Lindley, as an entirely new cross, and is at the present time in the possession of Mr. Ambrose of Battersea—in whose establishment it originated—and I believe has not as yet been let out to the public. Having said thus much of those which we think in a great measure best adapted for hybridising, we will offer a few remarks for the guidance of those who may not be acquainted with the best mode of preparing the plants for seeding. They should be kept in pots as small as possible, so that they may not grow too freely, as it will be found that those which become pot-bound seed the freest. They should be placed in a situation as sunny as possible, in the front of a house, or on a shelf, where they can have a free circulation of air at all times. Canvass should be placed round the house to exclude the bees, and great care must be taken to remove the anthers from such flowers as are intended for impregnation, before they deposit their pollen, or the operation will be next to useless, at least you cannot calculate with any certainty upon the produce.

In addition to the leaves above represented, we have also among our fancy seedlings, one thousand of which we hope to flower next season, some very distinct and remarkable characters, certainly more novel than anything we have before seen; in fact, our success this season emboldens us to say that the foliage of Pelargoniums is capable of as much change as the most fastidious could desire; and Messrs. Foster, Hoyle, Gaines Beck, and the west country growers, if they only make the experiment will find there is yet an unexplored field open for them, and that it may be, in a commercial view, worth their while to try the experiment of transferring some of their fine flowers to the elegant foliage of some of the old oak-leaved kinds. They would also be gainers in another way; they would improve the constitution of their plants, for it is notorious that some of them have been breeding in and in so long, and feeding so high to produce colour, as to bring their stock into a very diseased and unhealthy state. One raiser this season could not supply the plants ordered of two of his seedlings, and even the plants sent out were mere shadows of what the same raiser used to supply. We all know that breeders in the animal kingdom when their race of animals become weakly, go to a common stock for a male parent, and we have no doubt that the breeders of diseased Pelargoniums are paying the penalty of working, or attempting to work, against the laws of nature. In conclusion, I can only remark, I shall be very happy to show the seedlings to any person who may feel interested in the matter, and who may think fit to pay a visit to this place.

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ON THE ACCLIMATATION OF PLANTS.

BY MR. SAUL, GARDENER TO LORD STOURTON, ALLERTON PARK, YORKSHIRE.

WHEN we consider the great number of plants, trees, and shrubs, of every kind, that are yearly introduced into Great Britain from all parts of the world, through the exertions of persevering and indefatigable collectors; when we reflect what ornaments many of them are to our pleasure-grounds and parks; and when we think on the large sums of money that are in this manner annually expended—we may be easily convinced how important a subject that of the acclimatation of plants is. It is now a well established fact in Vegetable Physiology, that all plants are peculiarly and specially adapted to the soil and climate they inhabit; or, in other words, their organization is fitted to the conditions and circumstances they are born under. If, therefore, we wish to succeed in the acclimatation of plants, we must make ourselves acquainted with all the circumstances by which they are surrounded in their native localities. Every region of the globe has its appropriate vegetation. There are vegetable forms adapted to every soil and climate, however cold, arid, or moist. Some plants luxuriate under the influence of light and air; others prefer the shade; some grow on the sides and summits of mountains; some in valleys; some in boggy places; some on the banks of rivers; and some in lakes. The physical circumstances by which each of these localities, in any one country, is characterized, are very different. Some are characterized by a greater or less elevation above the sea; others by more or less exposure to light, by the nature of the soil; each and all of these circumstances influence the natural distribution of plants. But there are other agents which influence the distribution of plants—heat and cold; because each individual is so organised as to grow only within certain limits of heat and cold. Certain conditions of the atmosphere, as regards temperature and moisture; of the soil, as regards quantities and compositions; and of the situation, as regards altitude, exposure, and shelter: all influence the distribution and localities of plants. These being the principal circumstances which influence the localities of plants, and all plants being specially constituted to suit their native habitations, we at once see what principles are to form the basis of our operations in all our attempts at acclimatation.

No power of man can alter the constitution of a plant so as to make it grow and flourish under circumstances opposite to those under which it was born. The question then arises, have we, in Great Britain, all the circumstances requisite to the well-being of plants from all the temperate regions of the globe? We certainly have not all these; nevertheless, there is scarcely a locality in Great Britain that has not its own peculiar physical circumstances; and by improving them, it is our opinion, formed from experience, that we can get many plants, now esteemed too tender, to stand the climate of Britain.

Though we cannot change or alter the constitution of plants, still, by cultivation, we exert a controlling power over their habits. Every garden furnishes a thousand facts to prove this. To acclimatation are we indebted for a great portion of the finest ornaments of our gardens, the greater part of the delicious produce of our orchards, and a considerable proportion of the most common and valuable productions of our fields.

By acclimatation we have obtained many early varieties of vegetables. By this means have those early varieties of potatoes been produced, which are matured several weeks before other and later varieties. Here are acquired properties, brought about by cultivation.

By cultivation we can make our commonest shrub, which we thought most hardy, so tender, that the slightest frost will seriously injure, if not kill them.

We have seen Common Laurels and Hollies, when removed from a moist rich soil and sheltered situation to poor dry soil and exposed situation, linger for a very short time and die. And we have seen other Laurels and Hollies that were grown from cuttings in a poor soil and exposed place, when removed to the same exposed place where the others died, to grow and do very well.

We have also seen some hundred acres of hilly land that had been planted with Larch and Firs, and some six or seven years after being planted one half were dead, and the other part little better than when planted. The work had been entrusted to a common labourer, who, in obedience to orders, got his trees from a warm sheltered nursery, where they had been growing close together, as comfortable as if they had been in a hotbed. Here there was immense waste of time, labour, money, and land, through ignorance of the plainest principles. Nor is this a mere isolated instance; thousands such, though in a less degree, are to be seen daily. Much as has already resulted from acclimatation, we have strong reasons to expect much more important results. The thousands of beautiful trees which have been already ascertained to stand our climate, and which are now being so extensively planted through the length and breadth of the land, will, a century hence, give our Park scenery a grand and imposing appearance.

We may ask, do we always take proper measures to insure favourable results, when we commit to the open ground a newly imported tree, of whose constitutional habits we know but little?

In all cases we most certainly do not. For almost every new tree or shrub, no matter how hardy its constitution, is generally half killed with kindness. It is mostly planted in a "snug corner," where the soil is rich, deep, and moist, and well sheltered; and the consequence is late autumn growth, which, never getting ripened, is killed by the first frost. The effects of radiation in such situations is highly prejudicial to tender plants. A valley surrounded with low hills is more liable to the effects of radiation than the tops and sides of the hills themselves; and it is a well-known fact that dew and hoar-frost are always more abundant in the former than in the latter situations. Places surrounded by lofty and precipitous hills are not included in this observation, for in such a contrary effect is produced. Gentle slopes, which break the undulations of the air without naturally circumscribing the heavens, are most efficient in promoting this action. Radiation goes on upon the declivities of hills, and the air, which is condensed by the cold, rolls down and lodges at their feet. Their sides are thus protected from the chill, and a double portion falls upon what some people are apt to consider the more sheltered situation. From experience we know that the injurious effects of cold occurs chiefly in hollow places, and that frosts are less severe on hills than in the neighbouring plains. The general practice, (we will not say is—for, thanks to the spread of knowledge, sounder principles now prevail—but) has, been to plant newly imported trees in low sheltered situations in preference to hill sides, and the results have been that many plants perfectly hardy are in such places killed by the autumn frosts. We will mention one plant that is sufficiently hardy to stand the climate of Britain, yet this plant has been killed in many places by autumn, while in many other localities it has stood uninjured; this plant is Taxodium sempervirens.

As almost every locality in Britain has its own peculiar physical circumstances, only general directions can be given for acclimatation. The following course we have always found attended with eminent success.—We always choose, for newly-imported plants which we wish to acclimatize, a rather elevated situation, naturally dry if possible, and not exposed too much to sweeping winds; we endeavour to raise the temperature of the soil by drainage and keeping it open. Our chief aim is to get the wood well ripened and in good time, that is, as early in the season as possible; and this we accomplish by placing our pots under the circumstances we have just described. By this means we have had the pleasure of seeing many plants, that are generally denizens of the greenhouse, stand our severest winters without injury.

Review.

How to lay out a Small Garden, intended as a Guide to Amateurs, in Choosing, Forming, or Improving a Place; with Reference to both Design and Execution. By Edward Kemp, Landscape Gardener, Birkenhead Park. London: Bradbury & Evans.

Landscape Gardening, like all other sciences, though it has been inundated with elaborate treatises, which require a month to read, and years to understand, has never been illustrated by one of those elementary works, which may justly be considered as stepping-stones to the more solid materials of taste; and hence the small matters of Landscape Gardening, the laying out of "a quarter of an acre" which Mr. Kemp starts with, have never received that attention which they deserve; but have been left to the mere empiricism, or the know-nothingness of "day gardeners;" a class of men whose main object is plunder, and who calculate upon the gullability of their employers as a ready means of enriching themselves. It has somewhere been written by the late Mr. Loudon, though we cannot, at the present moment, call the place to mind, that it requires as much mind or talent to manage *properly*—a place of a quarter of an acre, with a few frames and hand-glasses—as one the size of Chatsworth; and, no doubt, taking the word *properly* in its full acceptation, Mr. Loudon was not far out of his calculation. To make much of a small place, requires considerable taste, perhaps more than where there is scope sufficient to carry out great principles without curtailment; for there is always less difficulty to carry out a design on a large scale than upon a small one.

The works of Evelyn, Brown, Repton, Gilpin, Price, Loudon, Downing, and others, though individually excellent, are far too recondite and philosophical for general readers. They treat of general principles, and though serviceable to the occupiers of large estates, are worse than useless to small proprietors. A man of industrious habits, after years of toil as a City merchant or tradesman, amasses, as he ought to do, sufficient to purchase a small estate, and then his real troubles begin. He wishes to build a comfortable house, to lay out a small garden, and to put his estate in good order. He calls in a friend who has a taste for building, perhaps a retired builder; then, Mr. Jones, his gardening friend, who has a beautiful place in Wales, advises about the garden; and, possibly, a third party is consulted as to the management of the land. After months, perhaps years, of continued scheming, they find they are all wrong; the house is improperly placed, the grounds have been hacked and hewn into what, but from their existence, might have been considered impossible shapes, and the proprietor, after having frittered thousands away, and finding his house cannot be altered, is advised, at last, to consult a landscape gardener, so as to bring the garden into something like shape. Well, a professional man is called in, and what does he find? Hills raised here, and holes dug there, here a walk and parallel with it another walk, both very probably useless; plants and shrubs of the foreground planted in the background, and *vice versa;* and, to crown all, the ground has not been drained, the borders trenched, nor the escape of water from the walks sufficiently provided for, and, the consequence is, the whole has to be pulled to pieces and re-arranged.

To remedy these things, and to afford persons of limited income the means of judging for themselves, and of gaining a little insight into the first principles of Landscape Gardening, this little work has been prepared, and if Mr. Kemp has not done all that fastidious persons may require, he has done more than, judging by precedents, could have been expected in a compass so limited—and what he has done, is done well. The work is divided into four parts, viz., "Preliminary Considerations as to the Choice of a Place; What to Avoid; What to Attain; and Practical Directions;" and these parts are divided again into sections and sub-sections, the latter being numbered, and each complete in itself. We have rarely perused a work with which we have been so much pleased, the directions, whether exemplifying principles or practical details, being alike plain and to the purpose, so much so that we believe an uninformed person may take it up, and learn more from it in a few days than he would from the large works on the same subject in half a life time. The great fault of the large works on this subject is, they are too expansive for ordinary readers, they deal too much in great principles which few have an opportunity of carrying into practice, and hence, with the amateur, they bewilder where they ought to inform, and leave the tyro to draw his own inferences, where principles ought to have been laid down; in fact, they have soared among clouds, and rhapsodised about the sublime and beautiful, while Mr. Kemp has taken his stand on solid land, and talked about it, as if he understood what he was about. With a few examples, borrowed from the work we must close our present notice, but we shall recur to it with pleasure occasionally for an extract.

In the Preface, Mr. Kemp states a fact, which must be familiar to every one, whether an ordinary or professional Landscape Gardener. At page 6, he observes:—

> "From the author's every-day intercourse with gentlemen who are either laying out new grounds, or are seeking to amend errors in design formerly committed, he is also enabled to perceive that sound and useful information is greatly wanted on the subject of landscape-gardening, and that to this defect is mainly attributable the deformities so lamentably frequent. He feels certain, moreover, that other landscape-gardeners will bear him out in the assertion, that their services are more employed to remedy irregularities which have been fallen into for want of due consideration and enlightenment, than to furnish entirely new designs. And the difficulty and expense of rectifying such errors can scarcely be over-estimated. It is wisely ordained that while a truly beautiful object will yield permanent and increasing delight, everything of a contrary nature is nearly sure, at some period or other, to pall and disgust the mind."

Under the part of "What to Avoid," the following is worth marking, as containing some sound good sense:—

"Possibly the greatest and most prevalent mistake of those who lay out gardens for themselves is *attempting too much.* A mind unaccustomed to generalise, or to take in a number of leading objects at a glance, finds out the different points embraced in landscape-gardening one by one, and, unable to decide which of them can most suitably be applied, determines on trying to compass more than can be really attained. One thing after another is, at different times, observed and liked, in some similar place that is visited, and each is successively wished to be transferred to the observer's own garden, without regard to its fitness for the locality, or its relation to what has previously been done. A neighbour or a friend has a place in which certain features are exquisitely developed, and these are at once sought to be copied. The practice of cutting up a garden into mere fragments, which is unhappily of too frequent occurrence, is the natural result of such a state of things.

"There are several ways in which a place may be frittered away, so as to be wholly deficient in character and beauty. It may be too much broken up in its *general arrangement;* and this is the worst variety of the fault, because least easily mended, and most conspicuous. To aim at comprising the principal features proper to the largest gardens in those of the most limited size, is surely not a worthy species of imitation, and one which can only excite ridicule, and end in disappointment. There is a wide difference between that variety which is so desirable, and the separation into minute parts, or blending of incongruous materials, now deprecated; the former being quite compatible with both unity and simplicity.

"A place may likewise and easily be too much carved up into detached portions, or overshadowed, or reduced in apparent size, by *planting too largely.* Trees and shrubs constitute the greatest ornaments of a garden; but they soon become disagreeable, when a place is over-run with them, by contracting the space, and shutting out light, and rendering the grass imperfect, and the walks mossy. Nothing could be more damp, and gloomy and confined, than a small place too much cumbered with plantations. Nor is its influences on the health of the occupants at all an unimportant consideration; for where sun and wind cannot get free play, a moist and stagnant air, very injurious to all animal life, is necessarily occasioned.

"But if this be the case with regard to any superfluous vegetation in general, it is much more true in respect to large timber trees. To introduce or retain many of these in a small garden is quite contrary to all the principles of good taste, and conducive only to trouble and discomfort. All the evils which attend a redundancy of the lower forms of plants are greatly aggravated, and carried to their highest point, by a similar overgrowth of trees.

"In the immediate neighbourhood of the house, moreover, it is particularly desirable that trees and shrubs should not abound. Independently of darkening the windows, they communicate great dampness to the walls, and prevent that action of the wind upon the building which alone can keep it dry, comfortable, and consequently healthy. It is almost impossible for any house to be otherwise than damp, which is too much and too closely surrounded by plantations. Any portion of these, therefore, which may be necessary to shut out the offices or outbuildings, should be placed as far from the walls as practicable, and by no means be allowed to be in contact with them.

"Another mode in which the effect of a garden may be marred by too much being aimed at is, in the formation of *numerous flower-beds*, or groups of mixed shrubs and flowers on the lawn. This is a very common failing, and one which greatly disfigures a place; especially as, where intended only for flowers, such beds usually remain vacant and naked for several months in the year. Flower-beds, too, when introduced in any quantity on a small lawn, have an exceedingly artificial appearance, reminding one of the character common to children's gardens. They interfere sadly with all ideas of breadth, harmony, and repose.

"A still more striking interruption to that beautiful continuity, which does so much in the way of producing size and expression, occurs when *unnecessary divisions* are introduced into a place. These may be employed to detach parts of a very different character; or, as in the old system of hedging-in particular portions, may simply be intended to change the scene suddenly, or furnish certain lines which are probably supposed to accord with the general character of the house. Not only, however, are those formal divisions mostly inadmissable in a limited space. but all kinds of separating lines, though varied and broken in the most artful manner, must be condemned, as a rule, unless where the place is tolerably large. These remarks of course do not apply to plantations or fences between the kitchen or pleasure-garden, or between the latter and the field; nor do they refer to those irregular masses of shrubs or trees which may sometimes be thrown partly across a lawn, to occasion a fresh scene behind them. They are simply aimed at such separating *lines*, whether of fence or plantation, as might be dispensed with, or for which there is no real necessity; as well as being further opposed to the practice of splitting up a place into minute parts, instead of making it as spacious and airy as possible.

"Partly for the reasons just alleged, and also because they introduce ugly strips of a conspicuously different colour on a lawn, a *multiplicity of walks*, beyond what are absolutely requisite, is very undesirable in a small piece of ground. It is acknowledged that numerous walks conduce to variety; but it is much better to have only that moderate amount of the latter, which can be attained without the sacrifice of simplicity. Walks that have no definite or sufficiently important object, and do not serve to reveal features or aspects of a place, that would otherwise be imperfectly seen or entirely lost, are always to be avoided, as destroying the smoothness, continuousness, and extent of a lawn, and producing a poverty and meanness of general effect."

And, again, at page 40, under the head, "General leading Principles," the following excerpt is correct, and to the purpose:—

"A garden should have more or less simplicity, according to its size and character, in its main outlines, arrangements, and furniture. The transitions in it should all be easy and flowing, the lines all graceful, the decorations elegant. Very rarely will a small garden bear being furnished with any striking evidences of wealth, or luxury, or elaboration. The hand should touch it so lightly as to leave few traces of its operation. Its forms and figures ought all to be gently rounded off, and unite softly with each other. Lawn and gravel, shrub, tree, and flower, must appear to belong to one another, and to fit into the place in which they occur.

"At the same time the *intricacy* which arises from a partial and pleasing involution of parts, from slight and insensible changes, and from that artful arrangement of single plants and groups which produces freshness of aspect and newness of vista from so many different points of view, must not be neglected. For a garden may be all that is correct, and tasteful, and classical, and yet, like a well-moulded countenance, prove dull, tame, and void of expression. It is play of feature—a something behind and beyond which has not been explored—novelty of expression, variation of aspect, an alluring attraction onwards after higher beauties—that constitutes, in both instances, the life, the spirit, and the charm. Intricacy is, in fact, the very soul of Landscape gardening."

In conclusion, we confidently recommend the work to all who are seeking information on this interesting subject; and if young gardeners spend their winter evenings in committing some of the leading principles to memory, their time will not have been spent without profit.—A.

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Miscellaneous Notice.

The Moutan Pæonies.—When Mr. Fortune visited China on the service of the Horticultural Society, the acquisition of new Moutans was one of the first objects to which he attended. In his *Wanderings* he mentions the beauty of the varieties seen by him at Shanghae; how he heard of yellow, and purple, and blue sorts; and at one time saw lilacs and purples, some nearly black; at another, dark purples, lilacs, and deep red. Afterwards, having discovered that these things came from a place only six or eight miles from Shanghae, Mr. Fortune tells us that he proceeded there daily during the time the different plants were coming into bloom, and secured some most striking and beautiful kinds (now in the garden of the Horticultural Society). The name *Moutan* seems to be an alteration of the word *Botan*, the usual name of these plants in Japan, as we are told by Kæmpfer, who adds that it is also called *Fkamigusa* and *Hatakangusa*. As the Japanese name the common Pæony *Saku jaku* and *Katta junkusa*, they seem to think the Moutan and Pæony distinct genera, in which we quite agree with them. It is to be suspected, also, that more species than one is comprehended under the common name of Tree Pæony, even although, as is probable, the Poppy Moutan (P. papaveracea) should be a mere variety of the common kind; for some of the Japanese kinds are said to form rapidly a woody stem eight or ten feet high—a stature which the common Moutans would only gain after many years in even favourable climates. The Chinese and Japanese are said to reckon their varieties of Moutans by hundreds, as we do our Roses. It is not improbable, now that the single, and, very slightly double kinds, are beginning to establish themselves in Europe, that we too shall have the same dominion over them as over Camellias and Chrysanthemums. The largest collection of these plants yet brought to Europe is that of Dr. V. Siebold, who imported them from Japan in 1844.—*Paxt. Flor. Gard.*

THE GARDENERS' AND NATURALISTS' CALENDAR FOR DECEMBER.

FLOWER-GARDEN.—IN-DOOR DEPARTMENT.

Conservatory.—The time has now arrived when the Conservatory, if properly supplied with flowers, will be much enjoyed; for, as the Ice King, with his crystal mantle, will soon wrap out-door flowers in his cold embrace, the few gay flowers in this house become, by contrast, more and more enchanting. At the present time, it should be gay with the following plants:—Fancy and Scarlet Pelargoniums, Perpetual Roses, Tropæolum Lobbii, and the dwarf double Scarlet; Begonias of sorts, Leschenaultias, Epacris, Ericas, and Camellias; Heliotropiums, Epiphyllum truncatum, and varieties, Primulas, Cinerarias, Luculia gratissima, and Pinciana; Achimenes and Gesneras of sorts. Add to these Chrysanthemums, and a few sweet-scented and variegated plants, and you have a splendid display. Keep every plant and pot scrupulously clean, and take great care to maintain a sweet and healthy atmosphere. Water such plants as require it; but do so cautiously, more especially to the tender plants. A little fire will be necessary through the day, occasionally, to expel damp; but avoid fires at night as much as possible. Ventilate freely on all favourable occasions, but avoid cold draughts.

Orangery.—This house, with its golden fruit, will now be a glorious sight, and will well repay any trouble previously taken to bring the fruit to perfection. Discontinue syringing, and keep a comparatively dry but healthy atmosphere. The plants, except those in small pots, will not require any water for the next two months, unless the weather is very severe, and the use of fire renders it necessary. The temperature by fire heat, must not exceed 45°; but it is not wise to let the temperature fall below 38°. Gather the fruit as it becomes fit, that is a little before the skin is thoroughly coloured. During the winter take care to wash thoroughly such plants as require it, both to destroy insects, and clean the plants.

Forcing-house.—The forcing of bulbs must now commence in earnest, and successions of such things as are required, must be introduced every fortnight; but success is very doubtful, unless the pots are full of roots. A few Lilacs, Azaleas, Rhodoras, Kalmia glauca, Rhododendrons, and Perpetual Roses may also be introduced, and Pinks, Sweet Williams, and Lily of the Valley towards the end of the month. Start them gradually at first, or they are sure to go blind, and throw the flowers.

A.

Stove.—If my former directions have been attended to, this house will present a very gay appearance; and, in order to prolong this, it is absolutely necessary that all decaying leaves and flowers should be removed so soon as they cease to perform their necessary functions upon the plant. No kind of dirt—such as filthy pots or surface-soil overgrown with liverwort or moss—must be allowed, and walls, tables, and floors should be alike clean and dry. Give air freely on all favourable occasions, and keep the temperature from 45° to 65° fire heat; water thoroughly when it is required; but on no account until then. Embrace every opportunity at your disposal for the perfect eradication of all vermin; keep a good supply of various-sized stakes, number-sticks, crocks, and pots; also a good assortment of soils in a dry place; when fires are requisite, light them in time to prevent the necessity of driving them to the danger of every thing within the house.

Orchid House.—Where a good collection of these are well cultivated, a beautiful display of many of the most effective of the whole order will, at this dull season of the year, impart to the house such a degree of enjoyment, that to our minds nothing can vie with it. For instance, if properly managed, it will have a temperature from 55° to 70° Fahrenheit; the atmosphere so charged with moisture as to be agreeable to any constitution. The attraction of this house just now will be found in the following plants, which are generally in bloom at this time of the year:—Cattleya labiata, one of the most gorgeous of all orchids; Dendrobium chrysanthum; Zygopetalum—several kinds; the lovely Epidendrum Skinneri; the violet-scented Cymbidiums; together with Sophronites, Oncidium ornithorhynchum, Oncidium Papilio, and sphacelatum, Ansellia africana, Phalænopsis amabilis, and many others. These, well arranged, constitute a charm peculiar to them alone. Continue former directions. Avoid excitement of all kinds, or it will act injuriously upon the whole collection.

J. G.

GREENHOUSE HARD-WOODED PLANTS.

Although at this season when there is comparatively little to do, (that is, if previous directions have been attended to), still a cultivator who takes an interest in his plants never needs stand still. There is always something that may be improved. It tends much to promote the health as well as the general appearance of the collection, if the situations of the different specimens are now and then changed. Besides, such a process will often discover the destructive attacks of insects or mildew which might otherwise occasion much mischief before they were perceived.

It is a good plan to give the plants of the various species of Leschenaultias, Pimeleas, Polygalas, Boronias, and perhaps some others, a good fumigating in this month, for, although the Leschenaultias may appear quite clear to the naked eye, perhaps after the fumigation they will be found to have been covered with small green fly. Plants of Gardoquia Hookerii should now be growing freely in a cool part of the stove. Shift, stop, and tie them out as they require it, in order to make nice bushy plants for flowering next summer. Towards the end of the month the varieties of Kalosanthes may be shifted; this is best done now, for, if left till spring, it may be unfavourable to a good head of bloom.

A few of the New Holland plants, such as the early flowering Dillwynias, Hoveas, Boronias, &c., may be had in bloom a month or two before their natural time by introducing them into a very moderate heat; but bear in mind that they will not stand hard forcing. Make a little fire occasionally to dry up damp, and attend to other matters as in last month.

Azaleas.—Towards the end of the month some of the new kinds that are to be made the most of in the ensuing year should be shifted and placed in heat, where they will soon begin to grow freely. If an early display of bloom is wanted, introduce into heat, in succession, some of the forwardest plants. Nothing adds so much to the beauty of the conservatory as a few good specimens of Azalea. The sorts best adapted for forcing are those having the habit of the old Indica alba. The other varieties, such as Lateritia and its hybrids, are best for late flowering.

Camellias.—Here every thing should be in perfect order, and the whole collection rapidly advancing into bloom. See that the opening buds are not injured by exposure to cold currents of air, but keep the house moderately warm without employing much fire heat.

J. F.

Heathery.—The specimen plants are now in a comparatively dormant state, and require little attention beyond that of looking sharply out for mildew, and taking care that they do not suffer from the want of, or from receiving too much water. Avoid fires as long as you can, except occasionally in dull weather, in the day time, to expel damp; but, if you can avoid it, do not allow your plants to become frozen. If not done before, tie and train any plants which require it, recollecting former directions that stakes are only necessary evils, and that the fewer you use the better your plants will look.

Heath Pit.—Attend to young stock, observing nearly the same general rules as for specimen plants. Cover securely in severe weather, but ventilate freely when the weather permits.

W. P. A.

GREENHOUSE SOFT-WOODED PLANTS.

Pelargoniums,—A critical season has now arrived for the management of these plants; every care must be taken to remove all decaying and superfluous leaves and shoots. Tie out as thin as possible, so as to leave the middle of the plants open to admit the air and light. Give all the air possible every favourable opportunity, taking care to avoid cold draughts as much as possible, which are very injurious to the plants, particularly those which are in a free state of growth. Keep them at all times near the glass, to prevent their drawing. Stir the surface occasionally to keep the soil open, and top-dress such as require it. Where large specimen plants are required, some may yet be shifted into larger pots, using for this purpose a good rich compost, prepared of good turfy loam, with some well decomposed cow and horse-dung; mix a liberal portion of sand, which is necessary at this season of the year to carry off the water freely. Drain with broken potsherds, and charcoal. Such plants as are required for early forcing may now be kept a little closer, which will cause them to throw up their flowers. The best kinds for the first flowering are Admiral Napier (red), Alba multiflora (white), Laneii (flesh colour), Gem of the Scarlets (a brilliant scarlet with white centre). For a second crop, General Washington (red), Surpass Napier (red), and Mrs. Johnson (flesh colour). With a moderate temperature, these will be found to answer well for the two first crops. Great care must be taken in watering, for on this the health of the plants will greatly depend. They should be allowed to get quite dry before watering at this season of the year. Light a fire occasionally in the middle of the day, when the sashes are open, to dry out the damp. The Fancy varieties being more tender than the foregoing, will not require so much air. Look very carefully into the plants to see that there are no decaying leaves or shoots, for if this is not attended to they are very liable to damp off and loose their branches. In potting these always keep the collar of the plants above the surface of the soil, and drain very freely; thin frequently, and keep the flower-buds pulled out, to throw the strength into the wood. Fumigate occasionally to prevent the green fly.

Calceolarias.—Look very carefully to these, and keep them clear of all small leaves and shoots. Peg down the shoots of the herbaceous varieties, that they may root up the stem, which will give them strength. If well rooted, pot into larger pots such as require it. A good rich compost is indispensable, with a good portion of silver sand. Drain thoroughly, and keep close for a few days. Fumigate occasionally, to prevent the green fly, as they seldom rally if these are allowed to gain ground. A little warmth is necessary for the more tender kinds. Give plenty of air every favourable opportunity. Water sparingly, and see that they are in actual want before you apply it. Stirring the surface now and then is necessary, to keep the soil open. If large enough, prick off such seedlings as were sown last month for late summer and autumn flowering.

Cinerarias.—Continue to give larger pots to such as are required for specimen plants, and pick out the hearts of some of the strongest for late flowering. Look carefully for mildew, and dust with flowers of sulphur any plant that may be affected with it. Peg them down as they get long enough, and thin out all the small leaves to throw the whole of the sap into the leading shoots. Give all the air possible in fine weather, and do not expose them to a damp atmosphere, which will cause the mildew.

Routine.—Turn heaps of soil and manure. and lay them up in ridges so that the frost and air may act on them. If not already done, house some for winter use. Take every opportunity in bad weather to wash pots; for much of success depends on clean and dry pots when the plants are put into them..

H. R.

FLOWER-GARDEN.—OUT-DOOR DEPARTMENT.

We should bear in mind that flower-gardening as practised in the present day by intelligent gardeners, is not the growth of a year or two, but the result of many years of observation and study, and also that it is far from perfect, notwithstanding all the additions which have been made to it of late, in the improvement of the forms of beds and colours of flowers, as well as other contrivances, which the improved skill of the gardener has brought into general use. This is, as it should be, to meet the onward course of things. The system of massing flowers took its rise at a time when all was confusion in flower-gardens, and, consequently, no settled principle was seen anywhere in the arrangement; but it is not so now, for year by year the flower-garden has been making known to us, by its own expressive forms, principles to guide and direct us, in the formation of the beds and the arrangement of the colours of the flowers, far beyond anything that the best of us have accomplished or conceived of flower-gardening. No "coming change" in the taste of the people can affect the principle of massing flowers, otherwise than for good, if that taste has been arrived at, by discussing the beauties and deformities of objects, with an intelligence sufficiently raised above the common ideas of art, as to be able to mass into one thought a range of qualities, so broad and so universal in their nature, as to be applicable to a more æsthetic age than this in which we live. The principle of massing colours is capable of indefinite exposition. and therefore new and beautiful forms may continually be looked for from it; but this is not to be expected by planting small patches of one plant here, and another patch a little larger there, with the brown earth interruptedly staring out between them, but by large and small masses, rich with fulness, and well contrasted in colour, so as to show each bed in all its individuality of character, which some people think, and not without good reason, will be the case with other things beside flowers, in the "good time coming." In making alterations in the plans of existing flower-gardens, or in forming new ones, study the forms and features of the place, and then adapt your plan accordingly. Look from various points of sight, and that more than twice or thrice, for the eye will embrace more and more every time it returns to any point of sight, until, at last, it rests satisfied with a few expressive lines. Whenever the weather will permit, open pits and frames as much as possible, to change the air in these structures, and harden the plants they contain. Damp air is very injurious; but dry air, in the absence of frost, should be allowed to pass rapidly through amongst the plants, and it will carry away all superabundant moisture. Sometimes a little fire heat may be necessary for a like purpose. J. C.

Rose Garden.—Take every favourable opportunity that the weather offers to proceed with the planting of those shrubs, and be careful to secure every standard, as soon as it is planted, from being blown about. This is also a good season to give assistance to those established in beds, or to standards standing singly. Those in beds should have the surface of the soil taken off about four inches deep, and then the under soil should be gently loosened, but not to injure the roots, and the ground well saturated with strong manure water. Where this cannot be procured from fermenting dung, a good substitute, may readily be found in night-soil, which may be diluted with five times its bulk of rain or pond water, pouring it over the surface, leaving the bed for several days to dry again; it may then be filled up with some good rich fresh soil, and left till the season arrives. In gardens in the vicinity of large towns, where fresh soil is difficult to procure, the same soil may be used again, with some rotten dung added to it.

As the season has now arrived that we may daily expect frost, the Tea-scented and other tender Roses will require attending to. Be in readiness for protecting, where large quantities of such kinds are grown. The most expeditious and safe way will be to take them up, and lay them in so, that they may be protected by rods being bent over, and mats laid on them as occasion may require. I commence by opening a trench across a bed, about five and a half feet wide, and put in the plants in a sloping direction, so that their heads are within a foot of the ground; from fifteen to thirty plants may be put in one trench. I then fill up the trench by opening another, and lay in another lot of plants in the same way, and continue doing so till all are done. I protect, in this way, from eight to fifteen hundred every winter, and they grow and flower most beautifully the following summer and autumn.

I must caution amateurs against being in a hurry in cutting back those that were budded last summer, and particularly to bear in mind, that to get a very vigorous growth next summer, the buds must be kept in as dormant a state as possible during the winter, which can only be done by leaving the wild shoots of the stocks uncut till the commencement of spring.

Roses in Pots.—Attend to those intended for forcing, and keep them protected from heavy rains or snow; and those that are required for early forcing, may be pruned, and set in a cold pit with plenty of air.

Routine.—Proceed with planting, manuring, and cleaning, and any other work that may be done now, as there is sure to be plenty of work to be done in the spring. Get all the stocks for the next year's budding planted as early as convenient, as they generally grow better for being planted in autumn. H. M'M.

Arboretum.—The practice of mulching newly-planted trees and shrubs cannot be too much enforced, and it may also be very beneficially applied to such as are already established, particularly in cases where great luxuriance and a quick growth are desirable, or where the soil is very poor. Good strong decomposed manure, where it can be spared, is best in most cases, but as that is not generally to be had, attention must be paid to always keeping a good supply of leaves collected every season, and thrown into heaps, which should be occasionally turned during summer, and wheeled out in favourable weather at this season. When ground is undergoing the process of trenching, previous to planting, a good supply of such kinds of compost should be incorporated with the soil, and care should be taken to secure the thorough performance of the operation both of trenching and mixing the compost; a little extra outlay in this primary stage will be amply repaid by increased vigour and luxuriance in after years. In preparing beds for Rhododendrons, Azaleas, and other American plants, we first trench the natural ground two or three feet deep, then apply whatever additional compost is necessary, such as sand, peat, decayed leaves, and manure, and then turn the whole backwards and forwards, so as thoroughly to incorporate the whole.

The principal operations both in this department and the shrubbery, will consist of planting and removing, until stopped by the frost. For plain practical instructions on the mode of conducting many of these operations with advantage, the reader is referred to the talented articles which have from time to time appeared in the pages of this work, bearing on the subject, and deserving of the highest consideration. I will now proceed to notice a few more desirable shrubs.

The Berberis family afford some highly desirable shrubs for amateurs or small proprietors. They flourish best in a light soil.

The common English Berberry or *Berberis vulgaris* forms a highly ornamental object when trained as a standard, and planted singly on the lawn, so much so indeed as to excite universal admiration in the autumn. When the berries are ripe it has often been compared to an enormous Fuchsia.

Berberis dulcis (Magellan), is also a very beautiful shrub, producing a great abundance of deep yellow flowers, contrasting admirably with the dense deep green of the foliage.

B. empetrifolia (Magellan), a low-growing shrub; flowers freely, and well adapted for rock work.

Berberis Aquifolium (North America).—Syn., *Mahonia Aquifolium.* This, as well as the three following, are very beautiful free-flowering shrubs, and are well adapted for planting in front of larger-growing shrubs, also for intermixing with Rhododendrons and Azaleas, to which they form a very useful adjunct both for contrast of foliage and flowers.

Berberis repens (North America).—Syn., *M. repens.* This is an excellent variety for rock work, and also for planting under the shade of trees, or on very steep banks, where it soon fixes itself, and prevents the crumbling down of the surface.

B. fascicularis (North America).—Syn., *M. fascicularis*, a fine variety, having a very distinct foliage, with a glaucous appearance.

B. nervosa (North America).—Syn., *M. glumacea.* Another very desirable distinct-growing variety, exceedingly compact and close in its habit; should be extensively employed as a border plant. J. C. R.

Auriculas and Polyanthuses.—Take every advantage of the favourable state of the present weather in subjecting these to its benefit by having the lights quite off the frames. The plants will require to be passed over, cleaned, and the injured leaves cut out, as also any premature pips; cleaning out any dust or dirt that may have accumulated since placing them in their winter quarters. Take also especial care that they are not suffering from damp by drip or otherwise; and be prepared with mats, or some other covering, in case of a sudden change in the weather; but carefully avoid covering, unless absolutely indispensable for the safety of the plants, as too frequent coverings tend greatly to weaken the plants, and unfit them for braving the cold. This applies also to Carnations, Picotees, &c.

Carnations and Picotees.—Attend to the layers of these, and cut out any of the leaves that are spotted, as a preventive of its further progress; passing the plants over and cleaning as the Auriculas.

Dahlias.—Many of the roots of these that have thin stringy tubers will require examination to clean off the mouldiness, or they will be found to decay before the time arrives for their being placed in heat to make plants for the beauty of next autumn.

Hollyhocks may still be increased by cuttings in gentle heat, and seedlings pricked into pots and forwarded, will bloom in perfection next summer.

Pansies in beds must be secured from cutting winds by fern-boughs, or some other material, when small hand-lights are not in use; those in pots in frames cleaned, and subjected to all the air possible in mild open weather, watering only when dry, and then with much discretion.

Pinks require but little attention just now. See that the winds do not twist them to and fro; which may be avoided by placing small sticks or pegs as supports; guard also from the attacks of rabbits by netting or some well-tarred cord, which they have a great objection to pass.

Tulips.—These, if planted when recommended, will in many cases be found peeping through the soil, from the very mild weather that has prevailed. Where such is the case, it will be advisable to cover such up in a conical hill by a little pure sand, if attainable; where such is not the case, a little peat-earth may be substituted, or any other absorbing soil. Cover the beds, in frosty weather, by mats, netting, &c.

The amateur florists will find, at this advanced season, much of their labour is over for the present; still there are many little things by no means to be lost sight of, as, for instance, the preparing fresh compost, turning over those already in, and subjecting them to the action of the frosts to cleanse them of any embryo insects which they may contain,—it being an indisputable fact that no florist can succeed without pure soils. The making of labels, sticks for tying, breaking crocks, &c., are all trifles not to be overlooked; and by being prepared in vacant times much lessens the confusion that would otherwise occur where a little fore-thought has not been exercised. Fresh plans for the planting in the coming spring, with a due consideration as to the arrangements of colour, height, form &c., of any flowers to be planted, may also serve to lessen the confusion of busy spring. Notes of new flowers carefully examined, and orders given for any that may be required in due time; deferring not to the last moment what may be done to advantage in the present leisure season. T. B.

FRUIT GARDEN.—IN-DOOR DEPARTMENT.

Fruiting Pines.—The principal crop for next year will require but little attention at this time, if the bottom heat was regulated last month. If the object aimed at is to get your fruit up in January and February, they will for the present merely require being kept dry, with air daily, according to the state of the weather. The thermometer may range between 58° at night average, to 70° during the day; if practicable, leave a slight current of air on through the night. Those plants which bloomed last month will require careful management; every hour of sunlight must be taken advantage of, and a gentle admission of air, regulated in respect to the out-door temperature, at all times in action. The night temperature may obtain a medium of about 60°; very moderate waterings will suffice, and at this season the humidity of the house will in most cases prove sufficient. Pines ripening will require a drier heat and plenty of air; have them as near the glass as possible to assist the colouring.

Succession Pines will require to be kept dry, with air daily. They may be safely wintered, if dry, at a temperature ranging from 58° to 65°.

Early Vinery.—If this house was started in October, the vines will now be breaking; when this takes place, remove the dung from the interior of the house, if such a plan has been adopted. The temperature must be kept up during the day to 70°, with an increase of 10° (if such can be obtained) from sun heat. The night temperature may be cautiously raised to 60° and even 65° when the vines are in bloom. Admit air daily, and during the night as well, if you have any means of doing so with safety; disbud and tie in the young shoots; unless there are reasons for it, stop the shoots one joint above the bunch. The roots, if the border is outside, must be kept in an equal state as regards heat, which should average about 70°; add more materials whenever the weather gives indications of becoming severe.

Prepare the successional houses by pruning and dressing the vines, and putting every thing in order for a commencement, which will take place according to the demand in the spring.

Keep late vineries dry and well-aired; look over the bunches weekly. J. S.

Figs.—If our former directions have not been already attended to, no time should be lost in doing so. In severe weather sufficient fire must be applied to exclude frost. If any of the plants growing in pots or tubs require a shift, this is an excellent time for doing it. Use turfy loam and a little leaf soil, and place plenty of drainage in the bottoms of the pots and tubs.

Peaches.—In the early house endeavour by all means to maintain a healthy moist atmosphere; syringe the trees two or three times daily with tepid water; use as little fire heat as possible. Nothing is so prejudicial to early forcing as overheating. Ventilate freely on fine days, and keep a night temperature ranging from 40° to 45°, always raising the temperature 8° or 10° in the early part of the day.

In mild open weather a night temperature of 50° will be safer than 45° in cold frosty weather; the temperature out-doors in the former case may be 50° or more, while in the latter case it may be 10° or 20° below the freezing point; practical experience in such cases is alone the safe guide; aim as much as possible at the standard we have laid down. In severe weather keep sufficient fires in the late houses to exclude the frost. If the outside borders are not already protected, cover them at once. We do not, however, advocate covering borders in order to send heat into them, but for the purpose of keeping that already in them from escaping; therefore do we advise their being covered immediately.

Strawberries.—If the directions given in our last respecting the winter storing of these have been followed out, their roots will be perfectly safe; but, in order to keep the frost from the crown, we recommend some hurdles or pea-stakes to be placed in front of the plants, but a little distance from them; in very severe weather some straw or litter should be thrown over these. By this means we keep our plants from ever getting frozen; besides, no matter what the weather is, we can always get out some plants when wanted for forcing. The first batch of plants should now be introduced into the early peach house or vinery; bear in mind they cannot have too much light; therefore they must be placed near the glass: nor can they have too much air, unless in severe frosty weather.

M. S.

Cucumber House.—This will now be an object of great interest, and as this has been one of the most beautiful autumns I ever remember, it must be chargeable to the gardener if everything in the Cucumber-house is not what it ought to be; with the fruit-bearing plants swelling off their fruit free from gum, and the younger plants growing vigorously towards the top of the house.

If the weather continues mild, be sparing with the fires by night, as the plants will become stiffer, and in the end more robust, by a comparatively low night temperature. My maximum night temperature at the present time is 65°, and day temperature from 70° to 80°. I take great precaution to impregnate the fruit when dry, and never allow more fruit to bloom upon a plant than I intend it to mature, as it only exhausts the plants to no good purpose. The atmosphere must be kept moist, but the roots enjoy an intermediate state of moisture. If they are too dry they produce in great abundance small blossoms at every joint, if they are too moist they appear yellow and transparent, which will terminate in a dwindling decay of the whole plant. Stopping and thinning the fruit-bearing plants, must have strict attention, to remove every useless shoot on its first appearance; for as light is, at all seasons of the year, a most powerful agent in the healthy developement of all the vegetable creation, so it will require great diligence on the part of the gardener at this dull season of the year, to see that every ray of light is admitted that is under his control. The glass must have frequent washing to remove any particles of dirt or small insects that may accumulate to obstruct the light. If a supply of fruit is most required in the months of February and March, it will prove of great service to the plants to pinch off all the fruit up to the middle of January; the plants will then be able to carry a larger crop of fruit than if they were allowed to bear fruit at Christmas.

Dung Beds.—In all the operations to be performed by a gardener, perhaps there is not one which causes more anxiety than the cultivation of the Cucumber in dung beds for early purposes, for, if Cucumbers are required by the middle of March, it will be necessary to commence and sow the seeds early in December; and often, after two months' toil and anxiety, in one night the whole of the plants are destroyed by the injudicious application of green or unfermented manure to the linings, or by an unfortunate mouse taking shelter in the frame, and thereby admitting the rank steam so destructive to vegetable life. To prevent this, act upon previous directions and make good preparations for all demands; where manure is scarce and plenty of leaves at hand they will be found excellent to mix with the dung. Previous to making up beds or linings, let the leaves be collected as early as possible and stacked in heaps in readiness.

Stir up the surface of the seed-bed two or three times a-week, as that prevents any foulness or damp collecting on the surface. In potting the plants, use light peaty soil; they will root more freely in light soil than heavy, and are less likely to damp off; avoid giving water for some time after potting. Stir up the linings and top up with sweet hot manure; that will help to dry the damp atmosphere arising from the bottom heat.

The covering by night must be regulated by circumstances, such as heat of bed and external atmosphere; over-heat must be prevented by due attention to air by night, otherwise the plants will elongate without adding substance, which is detrimental to their after well-doing.

W. T.

FRUIT-GARDEN.—OUT-DOOR DEPARTMENT.

Peach, Nectarine, and Apricot.—Pruning and nailing may be proceeded with when the weather is mild, but during frost it should be avoided, as the operation lacerates the sap vessels, and frequently causes the shoots to die back. I am aware that some gardeners do not regard the state of the weather, and even recommend pruning and nailing when frosty; but as I have experienced its bad effects on the trees above-named, it is necessary to caution others. I believe the dying back of the shoots is often ascribed to other causes when this is the real one.

Apple and Pear.—As those against walls are very generally trained horizontally, I would strongly recommend iron studs to be driven in the wall at regular distances, to fasten the branches to. These studs are now nearly as cheap as cast-iron nails, and are certainly preferable for several reasons. If the present plan of fastening the trees to walls with studs and nails was entirely discarded, it would be better for them. Nature never intended that the branches of a tree should be twisted and distorted as they are, and that only merely to please the eye.

Strawberry.—The British Queen I believe to be one of the best flavoured grown; but unfortunately it is in some soils and situations an indifferent bearer, and in others the apex of the fruit remains green and hard after the main part of it is quite ripe. As this sort has neither of these objectionable qualities in some places, I think it quite possible to overcome them in others. It is now generally believed that there is a peculiar tenderness in the plants of this sort, and that they require some protection during winter; those, therefore, who are partial to this variety, should immediately slightly cover the plants with fern, pea-haulm, straw, or any other light material.

Orchard.—As favourable opportunities occur, cleanse the stems and prune the standard trees. This is generally a very neglected part of the fruit department; the trees have little attention paid them after the first few years they are planted; consequently, the fruit becomes small, and the flavour of it indifferent—the result of leaving the branches too thick to admit the sun and air. From the time of planting the trees they should be regularly looked over every year, the branches thinned, and those which cross the centre of the tree cut out. Every pains should be taken to have a well-balanced head, as a one-sided tree is a very unsightly object. A few year's attention will do much to renovate old, sickly, unproductive trees. If they have been neglected for a long period, and require a large quantity of wood to be cut out, it may be advisable to take away only a portion of it in one season, and the following season the other portion. If any larger branches are removed the wounds should be coated over with tar or paint, so as to prevent the wet getting in. The trees would be greatly benefited, if the stems and large branches were scraped and washed with soap suds, containing a little lime and

H. C. O.

KITCHEN-GARDEN.

At this season of the year very little cropping is required; the principal objects are to economize time by making whatever preparations are necessary for the reception of future crops, and to protect, as far as practicable, all things that are likely to suffer from the influence of frost. Few articles are in greater request than Parsley for culinary purposes; therefore, a portion had better be protected, as it cannot withstand severe frost with impunity; any other things, such as Lettuces, Endive, Cauliflowers, and Early Broccolies, should have whatever artificial accommodation can conveniently be bestowed upon them. Mulch the beds of Rhubarb, and cover well the roots of Globe Archichokes. Dig up or trench any quarters or spaces that may have become vacant, as directed for last month; other matters, such as stirring the soil between growing crops, should be attended to, as recommended on that occasion. Earth up Celery whenever necessary, choosing the finest days for the operation. Continue to sow small Salading weekly, and place the boxes in heat. Introduce Asparagus roots into pits or frames, where a gentle heat can be supplied; make up another bed for Mushrooms, and keep the temperature of the house from 50° to 55°. Rhubarb and Sea Kale should be introduced to this house, or be covered as often and in such quantities as the demand upon such articles renders necessary. Peas and Beans may be sown in some well-sheltered border, but the better plan is to raise the former in pots, the latter in boxes, and transplant them in spring. J. C. S.

WILD FLOWERS.

We retain our accustomed heading this month, but shall speak merely on the point mentioned last month, namely, the formation of local Floras, since there is little to be done out of doors at this time of the year.

A local Flora, properly compiled, should be much more than a list or collection of the plants of a given district; it should attempt to furnish the data upon which the more extensive generalizations of botanical geography are founded. The climate, soil, and subsoil, with the elevation, exposure, and other points, should be investigated, and in this way the means be afforded of testing the various theories of the influence of external agents upon vegetation.

The following points appear to be those which must be attended to, in order to this end:—

The district intended to be included should have its boundaries marked, not by county or parish bounds, or by rivers, but by the lines indicating the change of subjacent geological formations or rocks, forming the subsoil, and be further subdivided wherever there is a difference of subsoil within the district. Each subsoil district should have its general elevation above the sea marked, at least in hilly or mountainous districts, together with a division according to aspects in the last. The quantity of rain falling in the district should be ascertained, the prevailing winds, and the mean temperature at least of January and July.

Then all the species should be enumerated, and, by careful investigation in all parts of the district, their comparative frequency in the various subdivisions determined, noticing especially the *commonest*—those giving the prevailing character to each locality. In addition to this, all "accidental" or artificial causes modifying the distribution, or forming sources of the introduction of particular species, must be made out and particularly noted.

An explanatory catalogue of the plants contained in a district, drawn up on this plan, will furnish a very valuable contribution, not only to botanical geography, but to the physiological history of species, and the study of the general relation of plants to the conditions in which they exist; in fact, it is only when we shall have obtained a large number of such "Floras" that these departments of Botany will be brought into a clear and satisfactory condition. A. H.

ANIMAL KINGDOM.

Ornithology.—All hail! to thee, hearty old December, with thy frosty nose and snowy locks, we will greet thee kindly, like an old and trusty friend, for thou bringest with thee many joys, although thy path is not strewn with flowers. Like thy half-brother June, thou art not less welcome; few can look upon thy fruit—the pretty red berries of the Holly, as they deck the window of the humble home or stately hall, and not feel a quiet sort of joy, a little allied with sadness, arise within their breast; for it recalls to mind scenes of festivity passed with friends, many of whom have since gone from amongst us, and now sleep soundly in their narrow beds. May the earth lay lightly on them! Then thy Mistletoe—the lovers' friend—with its wax-like berries, what joyous associations are connected with it. When seen suspended from the ceiling the matron looks with pleasure to her youthful days, when she, a coy maiden, was enticed beneath it, and there had to pay the forfeit in a lover's kiss; the maidens look slily at it, and vow that they will not go within its influence—a vow more often made than kept.

But though so pleasant a time for us, the poor birds are often great sufferers. When the earth is covered with her snowy mantle, and the hedges stripped of all their berries, they are put to great straits to obtain food. The farm and rick-yards are now resorted to by many species of birds, collected together by the same cause—a scarcity of food. Birds that are strangers to each other during the rest of the year, are now united in a common brotherhood—misfortune making them all equal. Some birds suffer much more than others; the Fieldfares (*Merula pilaris*), although reared in a clime much farther north than ours, are mostly the first to be affected by long continued frosts, at times becoming so feeble as to lose all power of flight; and they have been picked up in large numbers in this exhausted state, a mere bag of feathers, the poor birds having been literally starved to death. But how differently fare the Blackbirds (*Merula vulgaris*); winter appears to be their time of feasting, for they are now a complete ball of fat; but then their mode of life is different; unlike the Fieldfares, which confine their search for food to the upper part of the hedges and bushes, the Blackbirds pursue theirs entirely about the roots, where they find a plentiful supply of snails and grubs without much trouble, merely scratching aside the leaves, the ground underneath being but little affected by the frost, from the protection afforded it by the thick covering of bushes; here they pursue their hunt after food in silence, and mostly singly, for they are very unsociable in their habits. The skill with which they batter the shell of a Snail to pieces to get at the inhabitant, is very amusing. The Redwing (*Merula iliaca*), and Thrushes (*Merula musica*), partake, in a great measure, of the habits of the Blackbird, so that they suffer much less than many others.

The Bullfinches (*Pyrrhula vulgaris*), will often, about this time, leave their woodland haunts and visit the fruit-gardens and orchards in small companies, where they commit much damage even at this season. The Larks (*Alauda arvensis*), are now congregated in large flocks, and are much on the wing travelling in search of food, which appears to consist, at this season, principally of any green stuff that is to be found, such as the leaves of turnips or cabbages, in pursuit of which they will often visit gardens in the close vicinity of dwellings. H. W.

ENTOMOLOGY.—The attention of the Entomologist and also of the Horticulturist, must now be devoted more to the preparatory than to the perfect state of many species of insects; although, even at this period of the year, not a few may be found fully developed. It is true that many species are now, in the form of eggs, deposited by the parent insects, at the close of the past summer, or during the autumn, and these will not appear as larvæ until the return of warmth in the ensuing spring, and it must be admitted, that the practical gardener who would secure his fruit trees or flowering-shrubs from the future attack of the larvæ to be hatched from those eggs, has no easy task before him, from the care with which instinct, or more properly speaking, the God of Nature has endowed the parent moth, fly, or beetle to place its eggs in some place of concealment or other, or else to cover them over with some coating which renders them equally invisible, not only to the eye of the gardener, but also to the far more prying eyes of birds, who hunt the retreats selected by the parent insects with the greatest care, and yet often, as we subsequently find by experience, fail to discover their prey in this state. Some species, for this purpose, as well as with the apparent view of enabling the animal, in its embryo state, to encounter and resist the diversities of the season, and protect them from the cold and wet of winter, cover their eggs with a clothing of different materials. Thus, the Satin Moth (*Leucoma salicis*), common on Willows, wholly conceals her eggs with a white frothy substance, which, when dry, is insoluble in water, and thus effectually defends them. A similar coating of a gummy material defends the very young larvæ of the small Ermine Moth (*Yponomeuta padella*), which are hatched late in the autumn, through the winter beneath a circular patch of strong glutinous matter, about one-eighth of an inch in diameter, placed generally on the under surface of the young twigs, so that as soon as a congenial change takes place in the atmosphere, in the spring, the young hungry larvæ are ready to make their appearance in swarms, and devour every young leaf which has appeared. (*Lewis Trans. Ent. Soc.*, i, p. 21). Other moths, as the Golden-tail Moth (*Porthesia chrysorrhæa*), the Gypsy Moth (*Hypogymna dispar*), and several others "surround their eggs with an equally impervious and more singular clothing—hair stripped from their own bodies. With this material, which they pluck by means of their pincer-like ovipositor, they first form a soft couch on the surface of some leaf; they then place upon it successively layers of eggs, and surround them with a similar downy coating, and when the whole number is deposited cover the surface with a roof of hairs, which cannot be too much admired, for those used for the interior of the nest are placed without order, but those employed externally are arranged with as much art and skill as the tiles of a roof, and as effectually keep out the water, one layer resting partly on another, and all having the same direction, so that the whole resembles a well-brushed piece of shaggy cloth or fur."—(*Kirby and Spence*, iii, p. 75.) Some species of Plant Lice—those pests of the gardener—are also enveloped in a white cottony down, detached from the belly of the parent aphis, by means of her long hind legs, each egg being separately coated with down.

But if it be difficult for the gardener and even for Tom-tits, and other insectivorous birds to find these eggs, there are still plans by which the former may secure himself, in some degree, against the injury which will otherwise arise in the following spring, from the larvæ which would be hatched from them. The most evident course to be adopted is to coat over the shoots of branches of trees infested during the preceding year with Caterpillars, with a solution of soap and other glutinous and oily materials, which will thus form an impenetrable barrier to the exit of the young larvæ when hatched. In like manner, if the stems and branches of the trees are washed over with turpentine, or even with hot water, the eggs will be destroyed.

At the present season great numbers of species of insects are to be found in the pupa or chrysalis state, it being another wise arrangement of Nature that during the period when the food of so many of these animals is not in existence, they should themselves be in one or other of those states of their lives when they do not require food. Hence, whilst very many of the species which undergo their transformations during the summer do not construct any cocoon, the great majority of those which pass the winter in the pupa state cover themselves with an envelope of some material, which protects them from the weather just in the same way as the coating on the eggs which we have just described; in this latter case, however, the coating is formed by an animal not for its own defence, whilst in the former case it is the animal itself which forms its own covering. It has been stated that probably nine-tenths of the extensive tribes of Butterflies and Moths, many Hymenoptera and insects of other orders, pass the winter in the pupa state. In placing these pupæ in security from the too great cold of winter and the attacks of enemies, the larvæ from which they [illegible] be metamorphosed exhibit an anxiety and ingenuity evidently imparted to them for this express design. By far the larger number are concealed under leaves, in the crevices or in the trunks of trees, &c., or are enclosed in cocoons of silk or other materials, and often buried deep under-ground out of the reach of frost.

Among the few perfect insects to be found at this season we may mention some of the larger Ground Beetles (*Carabus morbillosus*, [illegible] *&c.*) to be met with under stones and leaves in damp situations. As these are the gardener's friends, feeding upon soft-skinned larvæ, worms, and other insects, they must be carefully preserved as well as that ugly creature the Devil's Coach-horse *Staphylinus* (Goerius) *olens*, the dread of school-boys, from the fierce manner in which it throws up its tail and opens wide its powerful jaws. Many of the smaller Ground Beetles (Bombidiidæ) are also to be met with on grassy banks and similar situations, as well as various beetles which live in rotten wood and under bark, and in fungi and boleti (such as *Nitidula grisea*, *Engis rufifrons*, *Anobium tessellatum*, &c.). A few Moths may also be found, especially the December Moth (*Pæcilocampa Populi*), measuring about an inch and a half in the expanse of the wings, which are of a purplish brown colour with the base and slender inner margin red-brown, a buff stripe, very much curved, near the base, not extending to the inner margin, and a second one of the same colour, considerably undulated, beyond the middle; the fringe alternately grey and brown, hind wings paler with a slightly defined pale central stripe. The abdomen is thick and the insect is generally found on the trunks of trees, where it forms an essential part of the food of our soft-billed birds. The Yellow Line Quaker-Moth (*Orthosia flavilinea*), the Incomplete Moth (*Dasystoma salicella*), the Wingless Moth (*Cheimophila Phryganella*), and the Winter Tortrix (*Cheimatophila castanearia*), are also now to be found chiefly on the trunks of trees. J. O. W.

Gladiolus natalensis

vars 1 roseo purpureus 2 [illegible]

Nat. Order.—IRIDACEÆ.

GENERIC CHARACTER.—*Gladiolus*, Tournefort.—*Perianth* corolline, superior, irregular; tube rather terete; limb six-parted and two-lipped, the lobes unequal. *Stamens* three, inserted in the tube of the perianth, erect or sub-secund, included or exserted; *filaments* filiform; *anthers* linear, affixed by the back above the base. *Ovary* inferior, obtusely three-sided, three-celled; *ovules* numerous in many rows in the central angle of the cells, pendulous, anatropous; *style* filiform; *stigmas* three, petaloid-dilated. *Capsule* membranous, three-celled, loculicidally three-valved. *Seeds* numerous, pendulous, flat-compressed, winged, or more rarely globose, sub-baccate, with a loose or fleshy testa; *raphe* free within the testa. *Embryo* axile, but little shorter than the fleshy albumen, with the radicle reaching the hilum, superior.—Herbs, rare in Central Europe and the Mediterranean region; abundant and varied at the Cape of Good Hope; roots bulbous-tuberous; leaves two-ranked, equitant; flowers secund in a simple spike, often nodding; spathe two-valved, persistent.—(*Endl. Gen. Plant.* 1259.)

GLADIOLUS NATALENSIS, *Reinwardt.*—Leaves sword-shaped, ribbed in the middle, obscurely nerved; flowers bell-shaped; outer segments broadly ovate, obtuse and mucronulate; anterior inner segments linear oblong, the posterior obovate and convex.

SYN.—Gladiolus psittacinus, *Hooker.*

Fig. 1. *Var. roseo-purpureus.*—Rosy-purple Cornflag.—Flowers deep rose-red, marked with deeper purple-red.

Fig. 2.—*Var. Oldfordiensis.*—Oldford Cornflag.—Flowers delicate salmony flesh colour, marked with purple.

DESCRIPTION.—Perennial herbs, with "bulbous-tuberous" roots, or corms; stems erect, three to four feet high, with two-ranked equitant sword-shaped leaves, and terminated by the long crowded flower spikes. The flowers in the variety roseo-purpureus, are about three inches in diameter, of a deep rosy red, the upper divisions acutish, the lower segments streaked and veiny towards the throat with deeper purple red on a creamy ground; with age the red becomes discharged in streaks, giving the flowers the appearance of being mottled and streaked with white. In Oldfordiensis the flowers are of a delicate flesh colour with a salmony tinge, the upper segments broad, the lower divisions marked with a strong central and two or three smaller purple streaks, and becoming cream-coloured below; the flowers are about three inches in diameter. In both varieties, the flowers form a dense spike nearly a foot and a half in length.

HISTORY, &c.—These fine varieties were raised at the same time with the G. Willmoreanus, figured at p. 169 of the present volume, and were obligingly communicated to us along with specimens of the latter by Mr. Cole, gardener to J. Willmore, Esq., of Oldford. Their origin and cultivation are sufficiently explained at the page just referred to.—M.

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ON THE ASSIMILATION OF THE AZOTE OF THE AIR, BY PLANTS; AND ON THE INFLUENCE WHICH AMMONIA EXERCISES ON VEGETATION.

BY M. VILLE.*

FOR several years I have been occupied with researches on vegetation; and the results I have no doubt, will be found interesting. At an early period M. Th. de Saussure had observed that in the dissolution of sulphate of alumina it was changed into an ammoniacal alum when exposed to contact with the air, and when this exposure was sufficiently prolonged. This observation, which was made I believe in 1804, places beyond a doubt the presence of ammonia among the elements of our atmosphere. Since this observation was first made by M. Th. de Saussure, various chemists have been occupied in determining the ammonia of the air by methods more expeditious and certain. The importance which physiologists attach to the ammoniacal compounds in the development of plants, may serve to explain the eagerness in which chemists have engaged to effect this determination. At the present day, indeed, ammonia is considered the source from which the vegetable kingdom derives the azote which it consumes, whether this ammonia comes from the soil, manures, or the atmosphere.

Having perceived, by a long series of analyses—performed on masses of air much more considerable than those which had been previously operated on—that the quantity of ammonia which the air contains is scarcely appreciable when all accidental emanations which might be introduced into the analysis are guarded against, I have been led to doubt the reality of the part which has been attributed to it in the phenomena of vegetation.

In order to dissipate the doubts which arose in my mind, I sowed a certain number of seeds in a mixture of equal parts of white sand and powdered brick, which had been deprived, by calcination for several days in a porcelain oven, of all the organic matters which it could contain. This mixture, which was parted in a certain number of pots, received an addition of five per cent. of the ashes obtained from the combustion of plants of the same species which were to be cultivated. The pots in which the seeds were sown were enclosed in a large bell-glass (*cloche*) and hermetically closed. Every day the air of the interior was renewed by means of a large aspirator. But as this quantity of air, though considerable, could not contain enough of carbonic acid to supply the wants of the plants, an addition of five, then of seven per cent. of that gas was given by means of a preparation from which it was disengaged, bubble by bubble, as long as the renovation of the air was being effected. The air in being drawn from the bell-glass was made to pass into an analytic apparatus in which it was divested of the ammonia which it might contain. Thus two experiments were being made simultaneously: in the first [was ascertained], the dose of ammonia furnished with a certain quantity of pure air; and, in the second, the ammonia of a nearly equal quantity of air, after that air had served for the nutrition of the plants enclosed in the interior of the bell-glass.

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* From the *Comptes Rendus.*

In comparing the results of these two analyses, we perceive at once if the ammonia of the air contributes to the development of the plants. On the other hand, we know by the analysis anteriorly made with a certain number of seeds of the species which have been operated on, the quantity of azote which was introduced into the bell-glass with the sowing. When the experiment is finished, we know, by means of a similar analysis, the quantity of azote that the plants have assimilated during the course of the experiment, and, consequently, whether this azote comes from the ammonia or from the azote of the air.

Although the plants have not yet been grown to maturity or gathered, we may consider this question as settled. It is indeed obvious that a certain quantity of azote has been assimilated by the plants, and that that azote comes from the azote of the air; for the plants under the bell-glass have acquired a remarkable development, yet the air, in being drawn from the glass, is found to contain the same quantity of ammonia as at the time at which it was enclosed. Moreover, it is possible the ammonia of the air might be assimilated totally by the plants: this conclusion is not altogether devoid of force, seeing that the ammonia that the air introduced into the glass during four months that the experiments have been continued, hardly equals one or two centigrammes,* a quantity evidently too insignificant to produce any appreciable result in this phenomenon.

Thus, the consequence alone deducible from the inspection of the glass was, that the azote of the air was directly assimilated by the plants, and that the atmospheric ammonia had had no sensible agency. This result obtained, it remained for me, in order to complete the study of these phenomena, to determine the influence that a certain quantity of ammonia, added to the air, exercised in its turn on vegetation. In order to enlighten myself on this new part of the subject, I again made a sowing of seeds of the same species as in the preceding experiment. The pots were also placed in glasses similar to the first, and the air in the interior was then renewed with an aspirator of the same capacity. In the same way, also, an addition of five, then seven per cent. was made of carbonic acid. Indeed, all the conditions of the experiment were the same, except, however, a difference in the disengagement of a certain quantity of ammonia every day in the interior of the bell-glass. From the very first, the influence of this addition has been manifest. The leaves of the plants have assumed a beautiful and lively green: the stems have lengthened, and the branches, which have grown more numerous, are full of leaves. But all the plants have not submitted, in the same degree, to the influence of the new agent: the cereals appear to be the most easily affected of all. In the glass in which the air is pure, the cereals are lanky and etiolated—their stems creep rather than shoot up. In the glass in which a portion of ammonia is added to the air, they are vigorous, straight, their stems erect, and even the leaves, which are numerous and abundant, take an upright direction. Thus a second conclusion is deducible from the single inspection of the apparatus: it is, that the ammonia which is added to the air acts favourably on plants, and especially on cereals.

New and Rare Plants.

Pimelea macrocephala, *Hooker*. Large-headed Pimelea (*Bot.. Mag.*, t. 4543).—Nat. Ord., Thymelaceæ.—A fine greenhouse shrub, growing two to three inches high, with smooth erect, comparatively robust branches, furnished rather thickly with opposite, smooth, broad-lanceolate, thick, glaucous, stalkless leaves, which have the peculiarity, especially in the upper parts, of turning more or less in one direction—upwards; the involucre consists of four to six leaves, larger and broader than those of the stem. The head of flowers is about two inches and a half across, the blossoms numerous, flesh colour, the tube slender and downy, with a limb of four spreading or recurved segments, with ciliated margins. From the Swan River colony. Introduced by Mr. Drummond, about 1845. Flowers in summer. Messrs. Lucombe, Pince, and Co., of Exeter.

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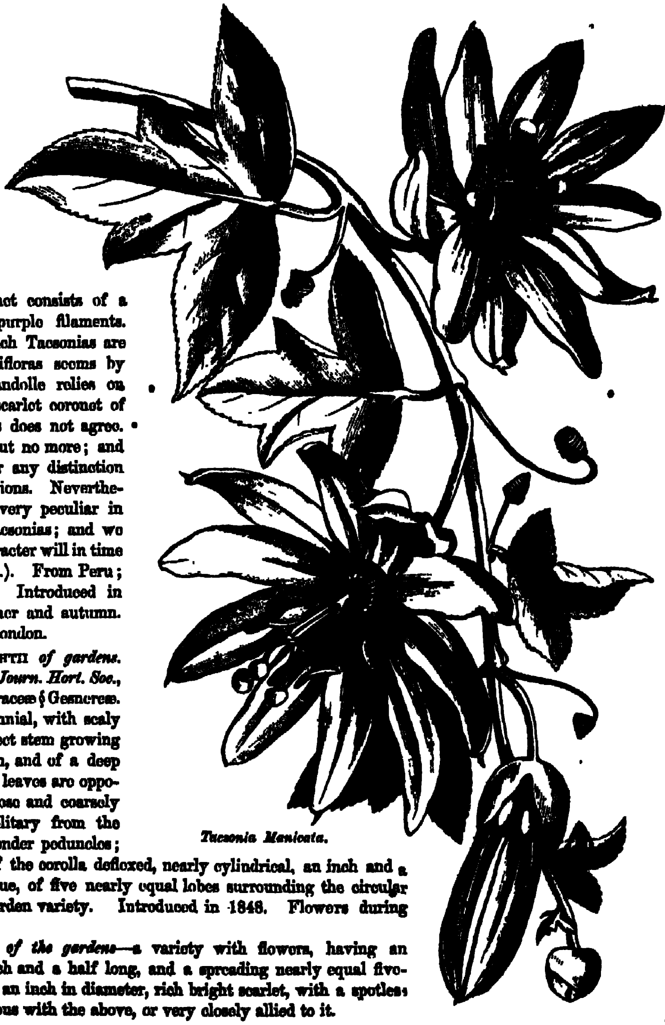
* A centigramme is equal to one-hundredth part of a gramme, which is a little more than fifteen grains.

Echites Franciscæ, var. pallidiflora, *Hooker*. Sulphur-coloured Echites of San Francisco (*Bot. Mag.*, t. 4547).—Nat. ord., Apocynaceæ § Wrightieæ.—A free growing stove climber, with opposite ovate-acute leaves, and simple axillary racemes of salver-shaped flowers, of a pale sulphur colour, with a rose-coloured eye. From Brazil Introduced from the Paris Garden before 1850. Flowers in summer. Royal Botanic Garden, Kew.

Tacsonia manicata, *Jussieu*. Manicate or gauntletted Tacsonia.—(*Paxt. Fl. Gard.*, i., t. 26).—Nat. Ord., Passifloraceæ.—A superb conservatory climber, requiring ample space for its rambling branches, which are furnished with three-lobed leaves, smooth above, downy beneath, and serrated on the margin. The flowers are large, brilliant scarlet, the short tube almost concealed by three large entire downy bracts; the coronet consists of a double row of short purple filaments. "The grounds upon which Tacsonias are separated from the Passifloras seems by no means clear. De Candolle relies on the long calyx-tube and scarlet coronet of the former—in which this does not agree. Meyer's analysis brings out no more; and it is impossible to gather any distinction from Endlicher's descriptions. Nevertheless, there is something very peculiar in the appearance of the Tacsonias; and we trust a real distinctive character will in time be discovered." (*Lindl. l. c.*). From Peru; 7000 feet above the sea. Introduced in 1847. Flowers in summer and autumn. Horticultural Society of London.



Tacsonia Manicata.

Achimenes Ghiesbreghtii *of gardens*. Ghiesbreght's Achimenes (*Journ. Hort. Soc.*, v. 193).—Nat. Ord., Gesneraceæ § Gesnereæ.—A handsome stove perennial, with scaly rhizomes, and a slender erect stem growing nearly or quite a foot high, and of a deep purple-brown colour. The leaves are opposite oblong-lanceolate, rugose and coarsely serrated. The flowers solitary from the axils of the leaves, on slender peduncles; bright scarlet; the tube of the corolla deflexed, nearly cylindrical, an inch and a half long; the limb oblique, of five nearly equal lobes surrounding the circular throat.—A Continental garden variety. Introduced in 1848. Flowers during summer.

Achimenes ignescens *of the gardens*—a variety with flowers, having an orange-scarlet tube, an inch and a half long, and a spreading nearly equal five-lobed limb, five-eighths of an inch in diameter, rich bright scarlet, with a spotless orange throat, is synonymous with the above, or very closely allied to it.

Achimenes Bodneri *of gardens*. Bodner's Achimenes.—Nat. Ord., Gesneraceæ § Gesnereæ.—A dwarf free-blooming variety, with the leaves acutely elliptic, coarsely serrated, an inch and a half long, bright green above, purplish beneath, and growing in whorls of three, with the flowers from the axils; calyx-lobes linear-lanceolate; corolla with a smooth tube, and an obliquely-spreading limb, about an inch in diameter, bluish lilac-purple, with a bright yellow eye, spotted with rich brown. A Continental garden variety. Introduced in 1849. Flowers in summer. Mr. Salter of Hammersmith.

Achimenes Baumannii *of gardens*. Baumann's Achimenes.—Nat. Ord., Gesneraceæ § Gesnereæ.—A compact growing, dwarf, free-blooming variety, with ovate-acute coarsely-serrated leaves, two inches long, reddish beneath, from the axils of which grow the flowers, having a narrow taper-lobed calyx; and a corolla with a slender hairy tube, and an obliquely-spreading five-lobed limb, about an inch in diameter, of a bright rose-purple, paler beneath, the eye yellow, slightly spotted with brown. A Continental garden variety. Introduced in 1849. Flowers in summer. Mr. Salter of Hammersmith.

RHODOLEIA CHAMPIONI, *Hooker.* Captain Champion's Rhodoleia (*Bot. Mag.*, t. 4509).—Nat. Ord., Hammelideæ.—A beautiful greenhouse shrub, rivalling the Camellia, but of very curious structure. It forms a small evergreen tree, but would probably blossom freely as a shrub. The leaves are alternate, elliptic-ovate, bright-green above, glaucous beneath. The flower heads grow at the ends of the branches, and are two inches and a half in diameter, of a beautiful rose colour, enclosing a large tuft of stamens. Those heads, however, consist of about five flowers, which are destitute of corolla, the conspicuous portion consisting of the leaflets of an inner involucre, which are about eighteen in number, and of an obovate-lanceolate form; an outer involucre consists of about a dozen more obtuse, silky, fuscous leaflets: the latter appear like sepals, the former like petals. From China: woods about Hong Kong. Introduced in 1850. Flowers (in China) in February. Messrs. Standish and Noble of Bagshot.

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SPRING PRUNING OF THE PEACH AND NECTARINE.

By Mr. J. TOWERS, C.M.H.S.

THIS question has been much agitated of late, but before any direct or satisfactory answer can be returned, which can guide the practice of the amateur, or inexperienced tyro, we must take into consideration certain causes that are likely to influence the constitution and habits of the trees. If a Peach or Nectarine-stone be inserted at a moderate depth into a bed of sound, yet free-working hazel loam, which has received no manure whatever, excepting it be that of its own decaying turf, the seed will germinate, send down a tap-root to the full depth of the good soil, and gradually produce a strong and luxuriant standard tree. On the other hand, a tree in a pot that has been worked (budded), if turned out into an open border, four feet in front of a warm south-east garden wall, will, as I have proved, produce an equally fine standard, but which, however it might blossom, I never knew to bear a ripe fruit.

I have now under immediate observation a low wall of alternate Peach and Nectarine trees, planted in the autumn of 1846; the soil is the maiden earth of a pasture that had not been previously disturbed till it was excavated for building; it is a blackish very light vegetable earth, sufficiently so for the growth of Kalmia, Heath, Azalea, and Rhododendron, but still combined with some loam—enough to enable it to absorb and fix ammonia, humus, and a portion of potash. The surface soil so constituted (and here I solicit the attention of the enquiring reader), might be fully eighteen inches deep, resting upon a bed of fine gravel, that it became an object to excavate and dispose of it to purchasers. The spaces so cleared, were filled partially with rubbish of all sorts, and over that was returned the natural surface earth, with its turf, which, including the quantity taken from the spaces now occupied by the buildings, increased the depth of the labourable earth to thirty inches or more. This kind of earth is not exactly such as I should prefer; nevertheless, the trees have flourished in it, and several have produced excellent fruit (their first crop), in the present year. As direct practical experience, in three counties, with soils of various qualities, present the means of comparison to a great extent, especially as the treatment of the trees here, since their planting in 1847, has devolved on myself alone, I feel authorized to offer the following remarks with some degree of confidence. In the first place, however, it will be useful to refer to able authorities, in order to understand what is expected from a well-trained tree, and upon what principles that training is conducted.

The late Mr. George Lindley says:—"The principal object to be kept in view, is a constant succession of young wood *throughout* every part of the tree; this is effected by pruning alone, and a judicious distribution of its young wood. The first rule to be laid down is, to shorten (at the winter pruning) every shoot according to its strength, and to prune to where the wood is firm and well-ripened. In May, the season for disbudding the tree, all fore-right shoots, as well as those from the back, must be carefully removed with a sharp small-bladed knife, taking care to cut close to the branch. Should young shoots of extraordinary vigour anywhere make their appearance, they should immediately be cut out, unless where *a vacant part* of the wall can be filled up, because an excess of vigour in one part of the tree cannot be supported without detriment to the other. When the trees are seen to throw out laterals from their stronger shoots, these should not be cut off close, but shortened to the last eye nearest the branch; and, if there is room, one or two of those first produced may be nailed to the wall; or the middle shoot may be cut out, leaving the two lowest laterals to take its place; thus frequently obtaining two fruit-bearing branches, when the former one would probably have been wholly unfruitful in the following year." (*Lindley's Guide to the Orchard, &c.*, pp. 301-3). I have selected and abreviated, but not altered the sense, as this article is not intended to be a treatise on pruning and training. Again, a periodical writer observes, on the July treatment of stone-fruit trees:—"Where the young shoots seem likely to grow very strong, they should be stopped as soon as they have made from four to six leaves, and from the laterals produced one or more may be selected, which will generally form good bearing shoots of moderate strength; but if the wood they produce is still too strong, stop again, and continue the practice so long as the tree persists in throwing out strong growing shoots."

Willing as I am to admit the correctness of these remarks, they cannot be considered otherwise than as offering palliatives for *symptoms*, and not an explanation of the *causes* which produce irregular developements. The skilful trainer of the Peach, with the view to obtain a moderate, but an equally distributed quantity of fruit, aims at having his trees "*green throughout.*" He therefore, at the first planting of a maiden tree, has an especial eye upon its roots; then, after strict examination, he at once amputates every one root that manifestly taps, or tends to tap perpendicularly downward; and then expands as regularly and horizontally as possible all the other roots; still, however, excepting in some degree the few that bear towards the wall. It is in the act of planting that the foundation for permanent fertility must be laid. Now, presuming that the soil is favourable, I believe that a tree should be planted shallow at the first; and, therefore, that a sort of pavement must be made of strong slates, or flat tiles, truly adjusted, and cemented at the edges, to extend at least thirty inches from the wall, and to right and left, and not more than eight or nine inches below the surface level of the border. Upon this pavement the roots are to be expanded in radiating order, the finest soil being trickled upon and between them, and washed in with pond water, from the rose of a watering-pot. The mechanical operations thus carefully performed, the roots must acquire an horizontal direction, which they will maintain during several years. Thus commencing at the beginning, a skilful pruner will have the figure much at his command. I am well aware that we seldom meet with trees so planted, and also that great depth of earth never produces a fine tree. I have seen, in very fine gardens, some trees almost destitute of any young shoots at all towards the main stem; others producing strong, rank shoots, which never can bear fruit. In my own garden, here, I have been perplexed with the constant reproduction of such shoots, all of them, I am persuaded, owing their origin to the depth of soil of my garden borders. It is all very well to persist in cutting back fore-shortening, and strictly attending to all the other directions alluded to above. Still, I maintain, that so long as the roots tap, and wander at their own free will, an irregular protrusion of shoots must be the consequence. When a gardener, therefore, witnesses the yearly production of long sappy shoots, with their secondary laterals, in trees which he did not plant, the only effectual remedy will be found in a judicious root-pruning at the commencement of the saps' movement, indicated by the earliest swelling of the buds. The ground should be carefully moved, and the tapping root, if any, amputated, when some sort of paving might be introduced under those roots that appear to incline downward.

Root-pruning is, however, a delicate and hazardous operation, because it is unfortunately true that we are ignorant whether the whole system of roots acts generally upon all the branches, or whether each of these sets of members performs reciprocally a peculiar and specific office. I have ventured to remove a root or two that curved in a downward direction, at the same time cutting out or rigidly fore-shortening the lateral secondaries; and thus have obtained, at length, some very good fruit. Here it will be appropriate to the object in view, to say, that if regular fertility takes place, it is more than probable the tendency to develope gross branches will be much abated.

As to the question of spring and summer pruning, there can be no doubt that, in May, *disbudding*, according to the directions above cited, should be regularly attended to; but the summer treatment must depend upon the then habits of each individual tree. The prevention of over luxuriance must depend upon the quality of the ground, and the position of the roots at *the time of planting*. If, on the contrary, trees become poor, and their developments weak and insufficient, the cure must be attempted, not by dung or rich dressings, but by a gradual renewal of the soil, first on one side, then on the other, so that in three seasons, the old being removed so far as, or farther than, the roots extend, its place shall be supplied by an ample quantity of mellow, turfy loam. I witnessed this restorative process in the fine garden of Shottesbrook Park, in Berkshire, and its effects were, in every way, satisfactory.

Miscellaneous Notice.

Horticultural Society. December 3.—As is usual at this season, the meeting was very thinly attended, and but very few subjects for exhibition were presented; still sufficient were there to shew the importance of continuing these meetings, even in the depth of winter, if only to allow Nurserymen and importers of new things the means of showing before persons competent to form an opinion of their work. This fact was never more clearly illustrated than at this meeting, when perhaps one of the most lovely of all lovely families—the Orchids—was presented from Messrs. Veitch and Son of Exeter. This plant belonged to the genus Vanda, and had a raceme of twelve large flowers of a delicate lilac blue colour, each as large as those of the well known *Phalænopsis grandiflora;* it is sufficient to say that this plant promises to become a formidable rival to the *Phalænopsis*, and is certainly one of the most remarkable of all the Orchids in cultivation; it is from India, and was introduced by the gentlemen before named. Next in importance as a new plant, was a specimen of Ionopsis from Jamaica, with small white flowers, from Messrs. J. A. Henderson & Co., of Pine Apple Place. These were the only novelties present; but Mr. Blake, gardener to J. H. Schroder, Esq., sent a splendid group, containing some noble plants, the most remarkable of which were two specimens of Epidendrum Skinneri, one with sixteen and the other with thirteen spikes of bloom; Zygopetalum crinitum, in splendid condition; the rare Dendrobium sanguinolentum, with Angræcum bilobum and Sophronites grandiflora. Mr. Glendinning, of the Chiswick Nursery, sent a plant of Hoya imperialis with eight noble umbels of flowers, proving that where there is sufficient heat this will become a valuable winter plant.

Of fruit, the most remarkable were two baskets of Grapes—Muscat of Alexandria, and Black Hamburgh—from the Vineries of G. J. Nash, Esq., of Bishops Stortford, Herts. It would be difficult to imagine finer Grapes than these, for they were perfection; large bunches, well ripened and finely coloured, and exquisitely flavoured. They were said to be grown by a common labourer, but that is nonsense, as we know a tale about the vines which produced these Grapes which we can unfold if necessary. Mr. Mitchell of Brighton sent some Black Hamburgh's—part of a second crop from the same vines in twelve months; and Mr. Hibbins, gardener to the Hon. James Morton, some Muscats which in the absence of Mr. Nash's would have been considered fine. Mr. Seymour, gardener to Lord Alford, sent some seedling grapes said to be raised in a house where Hamburgs and Muscats had grown together for years, and the seedling was said to resemble West's St. Peters; this, however, we deny; the form of bunch is different, the flavour is more musky, and altogether it is a better grape than West's St. Peters. From the garden of the Society were fine specimens of the Forelle and Vicar of Winckfield Pears, the last an inferior kind, and some good fruit of Napoleon. Mr. Parr, gardener to J. Jarrett, Esq., Camerton Court, Bath, sent two brace of Cucumbers not at all remarkable. Among the Plants from the Society's Garden the most remarkable were Cymbidium giganteum, Maxillaria bractescens, Brassia venusta, Lycaste glauca; Sericographis Ghiesbreghtiana with its splendid scarlet flowers; several kinds of Epacris and Heaths, and tolerable plants of Selago distans, Barbacenia purpurea, Hovea ilicifolia and Manettia bicolor.

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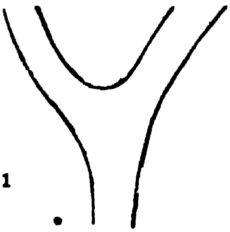
Review.

The Villa Gardener; comprising the choice of a suburban residence, the laying out, planting, and culture of the garden and grounds, &c., &c., illustrated with numerous engravings. By J. C. Loudon, F.L.S., H.S., &c. Second Edition. Edited by Mrs. Loudon. London: Wm. S. Orr & Co. 1850.

Among the many excellent works which emanated from the indefatigable industry of the late much to be lamented Mr. Loudon, we have always looked upon the *Suburban Gardener and Horticulturist* as two of the most useful; inasmuch, as they contain in a plain and comparatively condensed form, all the essential elements and leading principles of landscape gardening, architecture, and cultural instruction, which are spread over thousands of pages of his great works; and, in addition, being among his last works, they had the advantage of his great experience and refined taste, in selecting such parts only as he considered necessary, to explain the principles in a manner so plain and comprehensive, as to be suitable to those persons who had had no previous experience in gardening, either as an art, science, or simple occupation. The great pains which Mr. Loudon always took to explain his meaning in the most lucid and familiar manner is prominently evidenced in the volume before us, for though it contains only some 500 pages, it is embellished with no less than 378 engravings, some of them of the most elaborate description, and representing the leading features of scenery of such places as Redleaf, Wimbledon House, Hoole House, Kenwood, &c. &c., and a vast number of "designs for country villas, with their planting, culture, and renovation;" in fact, there is scarcely a subject connected with the choice of a suitable site for a villa, and its erection; or the preparing, laying out, and planting of the same, which is not explained in detail, and, to a considerable extent, illustrated with designs sufficiently instructive for those "who run, to read."

The present edition, which is very appropriately called the *Villa Gardener*, is edited by Mrs. Loudon, who has performed her task with considerable taste and skill; and though the work contains much which would have been better left out in the present day, as for instance the estimates of expense of works, or cost of plants, which are far from correct; still these are errors of degree which must always occur in standard works, more especially in new editions, unless they are brought down to the spirit of the times in which they are written. Estimates for works of this kind should always exceed rather than be below the market value of the work which they represent, for the value of plants, soil, and everything connected with the laying out of a garden is ever changing, and consequently, general book estimates should only be considered as approximating, and not as *the* value at all times. We consider it right to direct attention to this subject at the present time, as we know those persons who take the work as a guide will find they have been misled, and much unnecessary dissatisfaction will be the result.

The work is divided into four books—First, "General Principles, which should be taken into consideration previously to laying out and planting a Villa Residence; second, Ground Plans, for laying out and planting Country Houses and Villas of various kinds, which is again divided into Suburban Residences, Country Villas, and Country Mansions; third, Plant Houses; and, fourth, Lists of Ornamental Plants suitable to Villa Gardens, with their Culture." The above, however, only contains a very meagre outline of the contents of the work, inasmuch as each book is divided into many sections and sub-sections, each of which, could we spare the space, would amply repay a separate notice; but, with the books now before us for review, we must rest satisfied with a few extracts and specimens of the engravings, which have kindly been placed at our disposal by Mrs. Loudon.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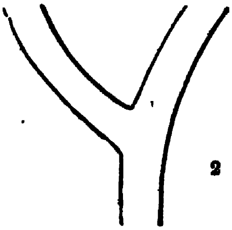
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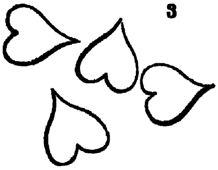
As a specimen of the style in which the work is written, the following extracts on the application of the principles of the recognition of art, will be instructive:—

"*Art is easily recognised in all walks and roads;* but not always artist-like art. The uniformity of the breadth, and the evenness of the surface, of a walk may secure it the character of art, while this character may be counteracted by the footpath-like junction of one walk with another, as in *fig.* 1, while the artist-like junction is shown in *fig.* 2. The same remark will apply to the forms of flower-beds on gravel or turf: they are always easily recognised as belonging to art, but not always to high art; that is, the shapes of the beds are not always artist-like. In *fig.* 3, the forms of the beds resemble those of common cordate leaves, thrown down in a natural manner, some in one direction, some in another, as if they had dropped off from a dried specimen in a herbarium. In *fig.* 4, the same leaves are disposed of, as a whole, in an artist-like manner. In *fig.* 5, the shapes, considered separately, are artist-like; but they are thrown down without the slightest regard to symmetry. In *fig.* 6, they are disposed of symmetrically, that is, according to art. Even a straight line, in gardening and in architecture, may be laid out or formed in an unartist-like manner; for example, a line of box, or a brick edging, to a walk, or to a bed or border, which, instead of being perfectly straight, is bent to one side, will be much more offensive to the eye of an artist, than a line perfectly straight in the direction of all its parts, but some parts of which are wanting. It is not that either line could have been formed by nature, but that the evidence of art is more decided in one case than in the other. The imagination easily supplies the parts which are wanting; but it will not so easily set that part of the line straight which is bent to one side. If, indeed, the line were bent equally to both sides, the absence of rigid art would be less offensive, because the imagination would form a middle line for itself."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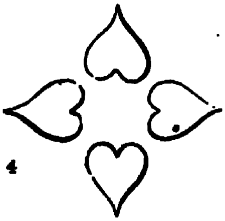
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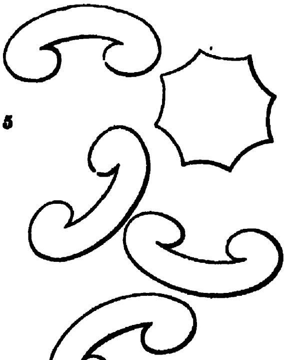
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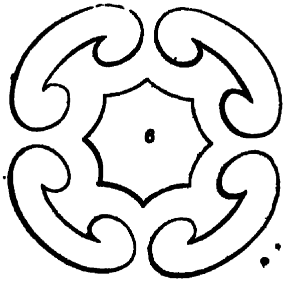
Here a great principle is made plain, yet how much it is sinned against or not understood, those who use their eyes as they travel about our great cities may readily perceive. The rude forms and inharmonious combinations of beds generally introduced into suburban gardens, are generally too peculiar to need special enumeration; and hence the engravings will not, we trust, be without their use.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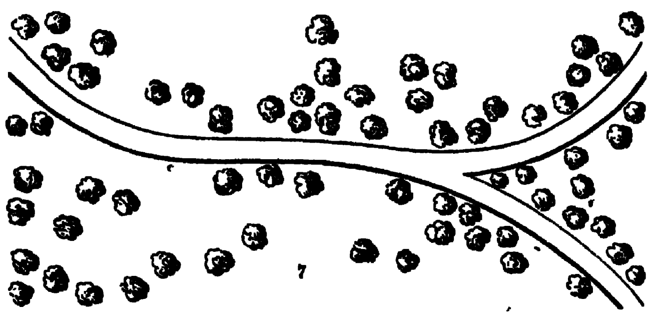
Art is easily recognised in all walks and roads, &c. As a further illustration of the same principle, we give an extract on Gardenesque imitation, on which Mr. Loudon remarks:—"Where the gardenesque style of imitating nature is to be employed, the trees, shrubs, and herbaceous plants must be separated; and, instead of being grouped together as in forest scenery (where two trees, or a tree and a shrub, often appear to spring from the same root, and this root is accompanied by large rampant herbs), every gardenesque group must consist of trees which do not touch each other, and which only become groups by being as near together as is practicable without touching, and by being apart from larger masses, or from single trees or rows of trees. It is not meant by this, that in the gardenesque style the trees composing a group should all be equally distant from one another; for in that case they would not form a whole, which the word group always implies. On the contrary, though all the trees in a gardenesque group ought to be so far separated from each other as not to touch, yet the degrees of separation may be as different as the designer chooses, provided the idea of a group is not lost sight of. In *fig.* 7, the trees are arranged in the gardenesque manner; and in *fig.* 8, in the picturesque style. The same character is also communicated to the walks; that in the gardenesque style having the margins definite and smooth, while the picturesque walk has the edge indefinite and rough. Utility requires that the gravel, in both styles of walks, should be smooth, firm, and dry; for it must always be borne in mind, that, as landscape-gardening is an useful as well as an agreeable art, no beauty must ever be allowed to interfere with the former quality."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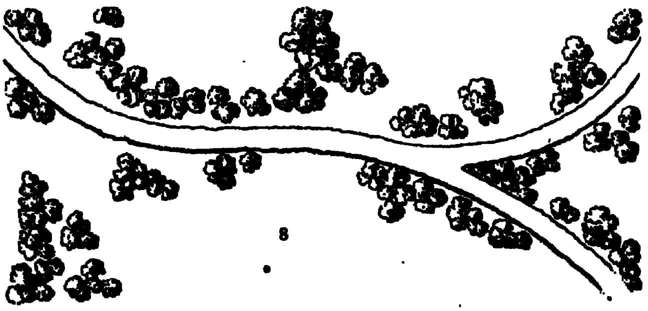
These two styles are scarcely sufficiently understood, but upon a correct appreciation of them depends, in a great measure, the disposal of many of our most valuable plants. Again, Mr. Loudon, with great judgment, remarks, "*In laying out and planting grounds*, or in criticising such as are already formed by eminent artists, it is necessary always to bear in mind that difference between the gardenesque and the picturesque; that is, between a plantation made merely for picturesque effect, and another made for gardenesque effect. Gardenesque effect in plantations is far too little attended to for the beauty of the trees and shrubs, whether individually or collectively; and picturesque effect is not generally understood by gardeners; so that the scenery of suburban residences is often neutralised in character by the ignorance of professional landscape-gardeners of the gardenesque, and of professional horticulturists and nurserymen of the picturesque. To make the most of any place, however small, all the styles of art ought to be familiar to the artist; because there are few places in which, though one style prevails, some traits of other styles may not be advantageously introduced. In planting, thinning, and pruning, in order to produce gardenesque effect, the beauty of every individual tree and shrub, as a single object, is to be taken into consideration, as well as the beauty of the mass; while in planting, thinning, and pruning for picturesque effect, the beauty of individual trees and shrubs is of little consequence; because no tree or shrub, in a picturesque plantation or scene, should stand isolated, and each should be considered as merely forming part of a group or mass. In a picturesque imitation of nature, the trees and shrubs when planted, should be scattered over the ground in the most irregular manner; both in their disposition with reference to their immediate effect as plants, and with reference to their future effect as trees and shrubs. In some places trees should prevail, in others shrubs; in some parts the plantation should be thick, in others it should be thin; two or three trees, or a tree and a shrub, ought often to be planted in one hole, and this more especially on lawns. Where, on the contrary, trees and shrubs are to be scattered in the gardenesque manner, every one should stand singly; as in the geometrical manner they should stand in regular lines, or in some regular figure. In the gardenesque, there may be single trees and single shrubs; but there can be no such thing as a single tree in the picturesque. Every tree, in the picturesque style of laying out grounds, must always be grouped with something else, if it should be merely a shrub, a twiner, or a tuft of grass, or other plants at its root. In the gardenesque, the beauty of the tree consists in its own individual perfections, which are fully developed in consequence of the isolated manner in which it has been grown; in the picturesque, the beauty of a tree of shrub, as of every other object in the landscape, consists in its fitness to group with other objects. Now, the fitness of one object to group with another evidently does not consist in the perfection of the form of that object, but rather in that imperfection which requires another object to render it complete."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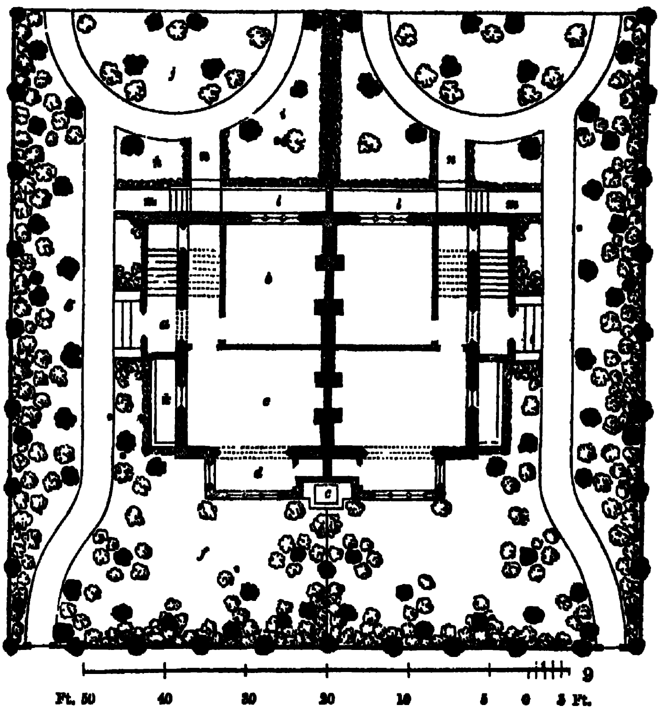
The following, as general rules, may not be without interest:—"It may safely be laid down, that whenever a piece of ground to be laid out as a garden is small, and bounded by straight lines, the geometrical style is that which ought to be employed; that when the ground to be laid out as a garden is large, it may be laid out in any style, or partly in the regular, and partly in the irregular styles; and that where the surface of the ground is varied, the regular style is most suitable; while the geometrical style should be preferred when the surface is even or flat. With respect to those modifications of the natural or irregular style which we have described as the picturesque, gardenesque, and rustic, or rural, the first, as it requires least labour in the management, is best adapted for grounds of considerable extent; the second is more suitable for those persons who are botanists, rather than general admirers of scenery, because it is best calculated for displaying the individual beauty of trees and plants, and the high order and keeping of lawns, walks, &c.; and the third for persons of a romantic or sentimental turn of mind, who delight in surrounding themselves with scenery associated with a station in life strongly opposed to that in which they are really placed; or to attract attention by producing a striking contrast to refined and artistical scenery, whether in the irregular or geometric styles."



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So far our extracts have been confined to the science of gardening, and if we could spare the room, there are many more passages that we should like to quote, but we must now pass to the second book—viz., "Ground plans for laying out and planting suburban residences."—As a specimen of the style in which this department is managed, and of the elegant manner in which it is illustrated, we give the annexed engraving of "A double suburban villa, with an ornamental garden," the principal feature of which is to make them have the appearance of a single house, and to this end the gardens are planted principally with low shrubs and trees, as well to assist in the illustration as to diminish the expense of keeping the garden.

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"*General arrangement.*—Fig. 9, shows a common and at the same time an effectual mode of arranging and placing the entrances of two small suburban villas, so as to make them have the appearance of a single house. In this case, a square building, containing two houses, is entered by porches at opposite sides; and there are back entrances to each house, communicating with the area, and the garden behind each. The space in front of the houses is divided by a wire fence in the centre; so that a stranger entering from the street, and proceeding towards either house, sees across the whole width of the front garden; and both the houses and gardens appear to him to be one, and to be occupied by the same family. We have shown in this figure how shrubs and low trees may be distributed so as to aid this illusion. Each house contains an entrance-porch and staircase (*a*), dining-room (*b*), and drawing-room (*c*), with a recess, which, in Elizabethan houses, is called a bay (*d*), communicating with a small closet. Between the two houses there is a pedestal and a vase, as indicated at *e*; and on the lawns (*f*, *g*, *h*, *i*, and *j*) there are no flower-beds, but only flowering shrubs and low trees; *k* and *l* are verandas; *m*, the sunk area, communicating with the walk by steps, and leading to the door of the back kitchen; and *n* shows the descent, by a few steps, from the veranda to the garden. The style of these houses, designed for us by E. B. Lamb, Esq, is supposed to be the Elizabethan; and fig. 10, is a perspective view, showing the front of both houses next the road, and the entrance front of one of them.

" *The object in laying out and planting* these gardens we shall suppose to be a display of choice low trees and shrubs, but planted in such a manner as not to require much expense in keeping the garden in order. Flowering plants we shall imagine to be altogether dispensed with, except some in pots (which may be grown in a reserve ground, or supplied for a fixed yearly sum by a commercial gardener), for placing in the balconies over the bays, and under the verandas. The adjoining gardens we shall suppose to be planted much in the same manner; or, indeed, in any manner, provided a few trees, either fruit-bearing or ornamental, are sprinkled through them. Such gardens will not be offensive to look at, especially through a foreground of low trees; and hence, it will not be necessary to proceed on the supposition that much requires to be planted out, that is hidden or partially concealed by trees. The ground being drained and levelled, and properly trenched and manured, the walks may be blocked out; but the gravel or the pavement should not be laid for a year; unless, indeed, the walks are formed of pavement laid on stone piers.

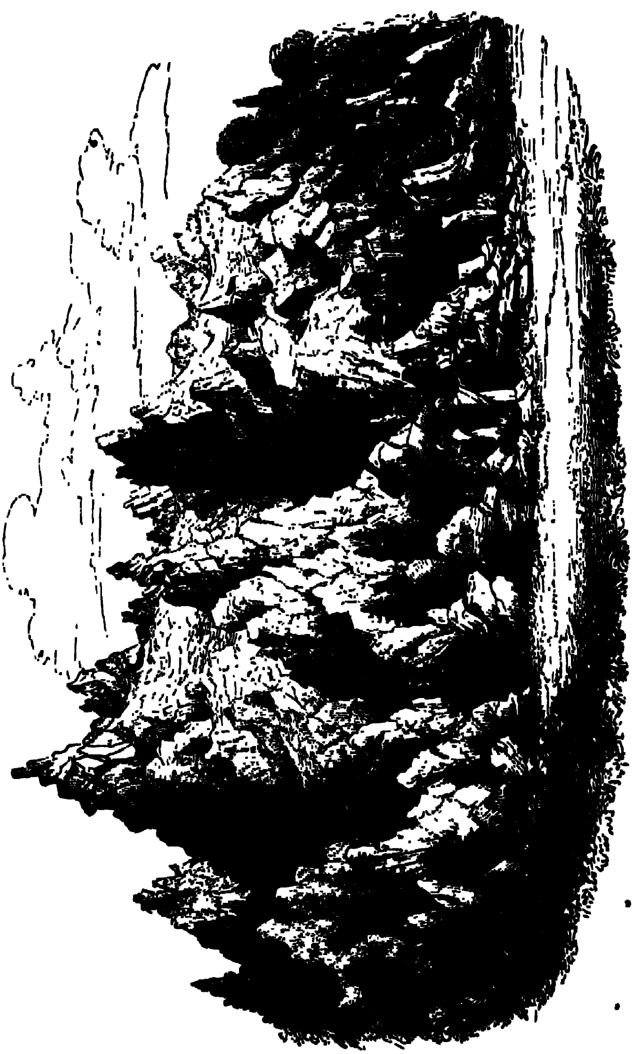
" Such a garden is well calculated for a person of taste, who gets his chief supply of culinary vegetables from a market-gardener or a green-grocer. It will look well with very little care and keeping; more especially if a due attention be paid to give sufficient room to the arbutus, the laurestinus, the autumn-flowering mezereon, and other winter-flowering shrubs; and the Cydònia japónica, the common mezereon, and the *Ribes* sanguineum, double-blossomed furze, and other spring-flowering shrubs. The dying off of the foliage of so many kinds of trees and shrubs in autumn, and their expanding foliage in spring, will produce a great variety of tints; exhibiting every morning something new, refreshing, and delightful to the lover of picturesque beauty, even if he should be no botanist. In this garden, as actually existing, all the trees and shrubs are named with zinc labels suspended from their branches with metallic wire. The zinc is in pieces about 1 in. broad and 3 in. long; not painted, but written with a prepared ink; and, in addition to the scientific and English names, the native country of the plant is added. Such labels, the wire included, cost little more than one farthing each; and they may easily be procured from any of the London seedsmen; they add greatly to the interest of the garden, and have a tendency to give young persons a taste for plants.

" The expense and management of a garden of this kind, supposing the length of the back garden to be 150 ft., the soil moderately good, and the subsoil such as not to require much drainage, the expense of laying out, and blocking out the walks, may be £20 or £25. The number of trees and shrubs required, exclusive of the ivy, may be 250, at the average price of 2s. each. The ivy, the grass seeds, and other expenses, may amount to £5; so that the total expense of laying out and planting each garden, exclusive of purchasing and laying in the gravel in the walks, may amount to between £55 and £60. If trees and shrubs were purchased which averaged 1s. each, the sum would be reduced to from £40 to £50; or, if the average of the trees and shrubs were 6d. each, then the total would be reduced to from £35 to £40. The expense of management, exclusive of taking care of the plants in pots, would be very trifling. If the walks were paved, nothing more would be required than mowing the lawn, clipping the edges of the grass along the walks, sweeping up leaves, and cutting off decayed flowers or dead twigs, all which need not cost more than £5 a year; and for a similar sum a commercial gardener would keep the veranda stocked throughout the year with boxes of mignonette, and supply a succession of plants in flower, during the summer months, for the balcony.

With another extract showing the rock-work at Hoole House, Cheshire, the seat of Lady Broughton, we must conclude our notice, but not without reiterating our conviction, that persons seeking information on the subject of which the book treats, cannot have a better guide; and young gardeners, and many old ones, too, should not be without it.

" The striking effect produced by the flower-garden at Hoole depends on the contrast between the smooth flat surface of the lawn, with the uniformity of the circular beds, and the great irregularity of the surrounding rock-work. The length of the flower-garden, within the rocky boundary, is sixty yards, and the breadth thirty-four yards. The baskets, twenty-seven in number, are in five square rows, and each basket is a circle of nine feet five inches in diameter. They are made of wire, worked on an iron rod, the rod being placed upon small pegs, to keep the basket to the level of the grass; and they are painted a yellow stone colour, to harmonise with the rocks and the veranda. They stand eight inches above the ground, the grass coming close to the iron rod. The distance between each, across the garden, is four feet, and down the garden, eight feet ten inches. They are planted with spring, summer, and autumn flowers mingled together; and the spaces left, when those are over, are filled with greenhouse plants—viz., geraniums, verbenas, &c., German stocks, and tender annuals, which keep the colour until the frosts destroy them; the hardy perennials remain for the next season.

" *The design of the rockwork* was taken from a small model representing the mountains of Savoy, with the valley of Chamouni: it has been the work of many years to complete it, the difficulty being to make it stand against the weather. Rain washed away the soil, and frost swelled the stones; several times the main wall failed from the weight put upon it. The walls and the foundation are built of the red sandstone of the country; and the other materials have been collected from various quarters, chiefly from Wales; but it is now so generally covered with creeping and alpine plants, that it all mingles together in one mass. The outline, however, is carefully preserved; and part of the model that represents "La Mer de Glace," is worked with grey limestone, quartz, and spar. It has no cells for plants: the spaces are filled up with broken fragments of white marble, to look like snow; and the spar is intended for the glacier. On the small scale of our engravings, and without the aid of colour, it is altogether impossible to give an adequate idea of the singularity and beauty of this rocky boundary; and we may add that it is equally impossible to create anything like it by mere mechanical means. There must be the eye of the artist presiding over every step; and that artist must not only have formed an idea of the previous effect of the whole in his own mind, but must be capable of judging of every part of the work as it advances, with reference to that whole. In the case of this rock-work, Lady Broughton was her own artist; and the work which she has produced evinces the most exquisite taste for this description of scenery. It is true it must have occupied great part of her time for six or eight years; but the occupation must have been interesting; and the result, as it now stands, must give her Ladyship the highest satisfaction.



ROCK-WORK AT HOOLE HOUSE, FROM THE CENTRE OF THE FLOWER-GARDEN.

" *The rock-work is planted* with a selection of the most rare and beautiful alpines, particularly with all the close-growing kinds; each placed in a nidus of suitable soil, and the surface protected from the weather by broken fragments of stone, clean-washed river gravel, the debris of decayed rock, moss, or other suitable substances, according as the object is to retain moisture; to evaporate moisture, in order to prevent the plants from damping off; to increase the heat, in which case dark fragments of stone are used; or to diminish it, which is effected by the employment of white pebbles, which, by reflecting the light and heat, keep the ground cool. The following is a list of the principal genera:—Saxifrages, Sedums, Cistus, Pansies, Rock pinks, Anemones, Dryas, Myosòtis, Heaths, Violas, Lychnis alpina, Erinus, Frankènia læ'vis, Campanulas, Ajugas, Alyssums, Anemones, O'xalis, Hepaticas, Antirrhinums, Aquilegias, A'rabis, Arctias, Asters, Astràgalus, Armerias, Anagàllis, Cheiránthus alpinus, Cerástium, Claytonias, Convallària bifòlia, Cóptis trifòlia, Córnus canadénsis, Cortùsa Matthìoli, Cyclamens, Calceolària Fothergilli, Drabas, Erodiums, Gàlium græ'cum, Gaulthèria procúmbens, Globularias, Crane's-bills, Gypsophilas, Gentians, Hieraciums, Hypericums, Hippocrèpis, Jeffersònia diphylla, Làthyrus, Lòtus, Leóntodon aúreum, Linums, Mitellas, Mœhringia muscòsa, Menziesias, Ornithopus, Onònis, Onósma, O'robus, Pinguiculas, Phyteumas, Pyrolas, Potentillas, Primulas, Pìsum marítimum, Polygala Chamæbúxus, Rùbus arcticus, Aubriètia purpùrea, Saponària ocymöìdes, Sàlvia pyrenàica, Statices, Silenes, Soldanellas, Solidàgo minùta, Béllis minùta, Teùcrium pyrenàicum, Tiarélla cordifòlia, Mitélla diphylla, Trientàlis, Thymus córsica, dwarf Veronicas. The evergreens are chiefly yews, privets, laurels, arbutus, rhododendrons, brooms, cedars, box, daphnes, laurustinus, &c.; to which are added azaleas of every kind, and various other low-growing shrubs."

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Miscellaneous Notices.

Motion in Plants.—Without attempting to enter on the difficult question of "spontaneous motion," or the difference between vegetable and animal life, it may be remarked that if nature had endowed us with a microscopic power of vision, and if the integuments of plants had been perfectly transparent, the vegetable kingdom would be far from presenting to us that aspect of immobility and repose which our perceptions now ascribe to it. The internal parts of the cellular structure are incessantly animated by the most various currents, ascending and descending, rotating, ramifying, and continually changing their direction; they manifest themselves by the movements of a granular mucilaginous fluid in water plants (Naiades, Characeæ, Hydrocharideæ), and in the hairs of phænogamous land plants. Such is the peculiar molecular movement discovered by the great botanist, Robert Brown, (which is indeed perceptible, not only in vegetables, but also in all matters reduced to an extreme state of division); such is the gyratory current (cyclose) of globules of cambium; and lastly, such are the articulated filamentary cells which unroll themselves in the antherides of the chara, and in the reproductive organs of liverworts and algæ, and in which, Meyen (too early lost to science!), believed that he recognized an analogy to the spermatozoa of the animal kingdom. If we add to these various currents and molecular agitations, the phenomena of endosmose, the processes of nutrition, and of growth, and internal currents of air, or gases, we shall have some idea of the powers which, almost unknown to us, are incessantly in action, in the apparently still life of the vegetable kingdom.—*Humboldt's Cosmos.*

Proposed arrangement of the British Carices.—At the meeting of the Botanical Society of Edinburgh, on Nov. 14, Mr. J. M'Laren proposed the annexed arrangement of the British species of Carex. Mr. M'Laren stated that in the present state of the science, unanimity could hardly be expected among naturalists with regard to the true limits of species; but, as it was necessary in describing the Carices, to adopt an opinion on this subject, he thought it better to lean to the side of simplicity, and rather to unite two plants whose identity might be doubtful, than to retain them as ambiguous and ill-defined species. The result is, that about ten of the species described in recent botanical works he has inserted merely as varieties. While agreeing with Reichenbach in dividing this large and natural family, the sub-genera have not been made to depend on the number of stigmas, because, by that arrangement, *C. cæspitosa*, *C. saxatilis*, &c., are placed along with the species which have compound androgynous spikes, and *C. pauciflora* and *rupestris* are likewise separated from the species with simple solitary spikes. In the general classification Mr. M'Laren has followed the system of Fries; but in the arrangement of the species some alterations have been made. The usual mode of arranging the British species, with glabrous fruit and terminal barren spikes, appearing exceedingly vague, and liable to many exceptions on account of the difference in the number, form, and direction of the spikes, even in the same species, he has re-arranged them according to the nature of the bracts and fruit, as shown in the subjoined table—

Sub-genus *Vignea* (of Reich. in part), spikes simple, solitary or compound, androgynous.

- I. Spikes simple, solitary; *Monostachyæ*, Fr.
- II. Spikes compound, androgynous; *Homostachyæ*, Fr.
  - a. Bracts not foliaceous, spikelets fertile below; *Hyparrheneæ*.
    - 1. Root creeping.
    - 2. Root fibrous.
  - b. Bracts long and foliaceous; *Bracteosæ*.
  - c. Bracts not foliaceous, spikelets fertile above; *Acroarrheneæ*.

Sub-genus *Carex*, (*Heterostachyæ*, Fr.), spikes simple, distinct, the terminal ones barren or androgynous, the rest fertile.

- I. Spikes unisexual, achenes biconvex, stigmas 2; *Distigmaticæ*.
- II. Terminal spike androgynous, fertile above, stigmas 3; *Tristigmaticæ Mesoarrheneæ*.
- III. Spikes unisexual, achenes trigonous, stigmas 3; *Tristigmaticæ Acroarrheneæ*.
  - 1. Fruit smooth, bifid; bracts without sheaths.
  - 2. Fruit smooth, entire; bracts sheathing.
  - 3. Fruit smooth, bifid; bracts sheathing.
  - 4. Fruit pilose, deeply bifid.
  - 5. Fruit pilose, entire, or nearly so; bracts foliaceous.
  - 6. Fruit pilose, entire; bracts membranous; sheathing.

Mr. M'Laren gave descriptions of the various British species and varieties.

ODONTOGLOSSUM CITROSMUM.

Nat. Order.—Orchidaceæ.

Generic Character.—Odontoglossum, *Humboldt, Bonpland, and Kunth.*—*Perigone* spreading, with narrow acuminate, free segments, the outer and inner equal. *Labellum* clawed, continuous with the column at the base, not spurred, undivided, the lamina spreading, crested at the base. *Column* erect, membranously margined, winged on both sides at the apex. *Anthers* two-celled; *pollen-masses* two, solid; *caudicles* linear, gland hooked.—Tropical American herbs, epiphytes, pseudo-bulbiferous; leaves plaited, scape terminal, sheathed, flowers showy.—(*Endl. Gen. Plant.* 1466.)

Lemon-scented Odontoglossum.—Pseudo-bulbs, sub-rotund compressed, smooth, or leaved (?); leaves oblong-ligulate, obtuse, shorter than the raceme; sepals oblong, obtuse, and sub-equal to the conformable petals; labellum clawed, uniform, bi-tuberculated at base, lateral, sub-truncate; dorsal wings of the column roundly-toothed.

Description.—A very handsome, scented pseudo-bulbous epiphyte; the pseudo-bulbs roundish compressed and smooth, bearing one or two leaves which are oblong strap-shaped, shorter than the raceme, obtuse or acute, and deep green. The flowers large, borne on an elongated rachis, forming a showy raceme; the peduncles diverging from the rachis. The sepals and two lower petals nearly alike; oblong, obtuse, wavy at the margins; white or slightly tinged with lilac, especially beneath. Labellum with a claw, continuous with the column at the base, not spurred, the claw yellow with two tubercles at the base; the limb lilac or rose-coloured, broadly kidney-shaped and emarginate. Column erect, with a membranous margin winged at both sides and at the back above, lateral and dorsal wings roundly toothed; flowers lemon-scented. This species closely resembles an Oncidium, but its labellum has two parallel fleshy plates at the base, forming an acute angle with the column, which has three wings, two lateral and one dorsal; these characters require it to be referred to Odontoglossum.

History, &c.—First exhibited at the gardens of the Horticultural Society in July 1842, sent from the garden of T. Brocklehurst, Esq., of the Fence, Macclesfield, to whom it had been given by Mr. Barker. Our drawing was made from an exquisitely coloured specimen—the result of Mr. Mylam's judicious management—exhibited during the past summer by S. Rucker, Esq., of Wandsworth. The species is a native of Mexico, and is said to have been introduced in 1841.—A. H.

Culture.—"Among the many beautiful Orchids now in cultivation this is doubtless one of the most lovely, especially where grown and exhibited in the style in which Mr. Rucker's successful gardener, Mr. Mylam, has for many years shown it; and we wonder, as it is very easily managed, why it is that so few fine specimens find their way to our exhibitions. Like all the Odontoglossums, this species requires to be grown well to insure its blooming strongly, and the best soil to grow it in, and all the rest of the genus, is the soft Devonshire peat; draining the pots thoroughly and keeping the plants in a cool part of the house. When the plants are in good growing condition encourage them by every means in your power, until their growth is complete, when they ought to produce pseudo-bulbs three inches in diameter. The season of rest should be uninterrupted by excitement of any kind; and guard cautiously against drip, which would be very injurious to the plants." For the preceding remarks we are indebted to Mr. Goode, a gentleman well known as having devoted considerable attention to the culture of Orchids.—A.

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ON THERMOMETER STANDS.

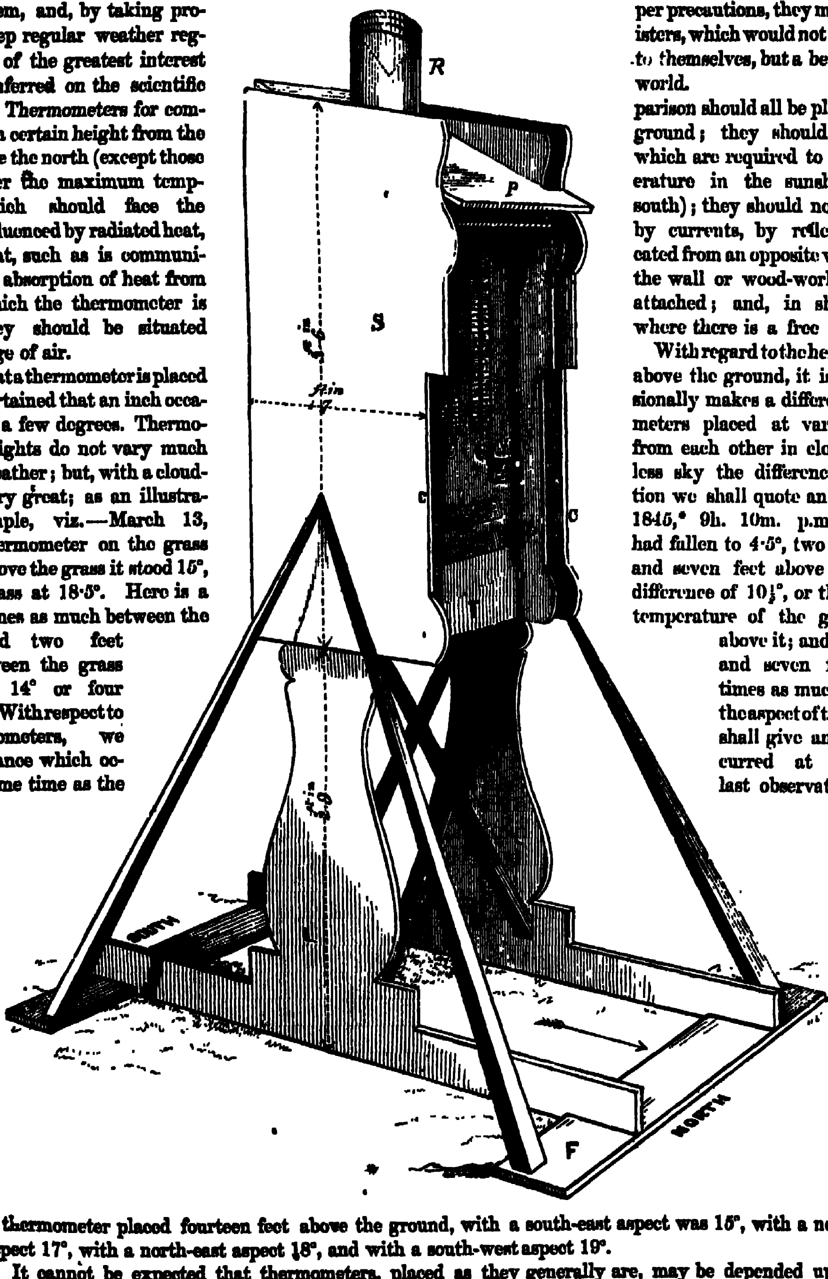
By E. J. LOWE, Esq., F.R.A.S., &c.

Having obtained good thermometers, the next important step is to place them advantageously. The errors arising from a want of knowledge in this respect are very great; and, where registers are kept, unless the instruments are placed in similar positions to others, they cannot be compared with any degree of accuracy, so that it is labour in vain to record the readings of a thermometer unless placed on a thermometer stand. It is next to impossible that, under ordinary circumstances, two thermometers may be similarly placed; but, Henry Lawson, Esq., F.R.S. (of Bath), to whom we are indebted for eminent service rendered to the cause of science, has constructed a thermometer stand which at once gives us uniformity in the placing of instruments; and James Glaisher, Esq., F.R.S. (of the Royal Observatory), has invented another for the like purpose, one or other of which should be used by all who take an interest in the changes of the weather; and, it is very desirable that gardeners should attend to this subject, as it is an all-important one to them, and, by taking proper precautions, they might keep regular weather registers, which would not only be of the greatest interest to themselves, but a benefit conferred on the scientific world.

Thermometers for comparison should all be placed at a certain height from the ground; they should all face the north (except those which are required to register the maximum temperature in the sunshine, which should face the south); they should not be influenced by radiated heat, by currents, by reflected heat, such as is communicated from an opposite wall, by absorption of heat from the wall or wood-work to which the thermometer is attached; and, in short, they should be situated where there is a free passage of air.

With regard to the height that a thermometer is placed above the ground, it is ascertained that an inch occasionally makes a difference of a few degrees. Thermometers placed at various heights do not vary much from each other in cloudy weather; but, with a cloudless sky the difference is very great; as an illustration we shall quote an example, viz.—March 13, 1845,* 9h. 10m. p.m., a thermometer on the grass had fallen to 4·5°, two feet above the grass it stood 15°, and seven feet above the grass at 18·5°. Here is a difference of 10½°, or three times as much between the temperature of the grass and two feet above it; and between the grass and seven feet, of 14° or four times as much.

With respect to the aspect of thermometers, we shall give an instance which occurred at the same time as the last observation.



A thermometer placed fourteen feet above the ground, with a south-east aspect was 15°, with a north aspect 17°, with a north-east aspect 18°, and with a south-west aspect 19°.

It cannot be expected that thermometers, placed as they generally are, may be depended upon, some facing the north, others the south; some the north-east, others the north-west; some three to five feet above the ground, others ten to twenty; some sheltered by a high wall, others by low palings;

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* See "Treatise on Atmospheric Phenomena;" by E. J. Lowe, Esq., F.R.A.S. Page 350.

some touching a wall, others distant from it; and some in the angle of a high building (cool as a cellar), and others exposed to the rays of the sun at one or other hour during the day.

"The Lawson Meteorological Thermometer Stand," which we shall describe (leaving Mr. Glaisher's stand for a future paper), is so arranged that it may be placed in any eligible situation; it commands a true north and south aspect; the instruments can be read off with the greatest facility, and they will be at a known distance from the ground; the instruments on the south face will have the meridian sun, and those on the north face will be always in the shade. The instrument is not costly, and were this stand universally adopted, observations, whether recorded here or at the antipodes, could be compared with each other with far less chance of error than has hitherto been the case.

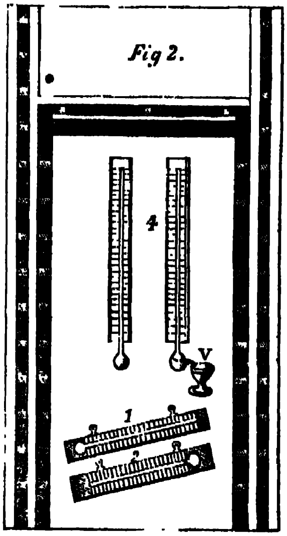

Fig 2.

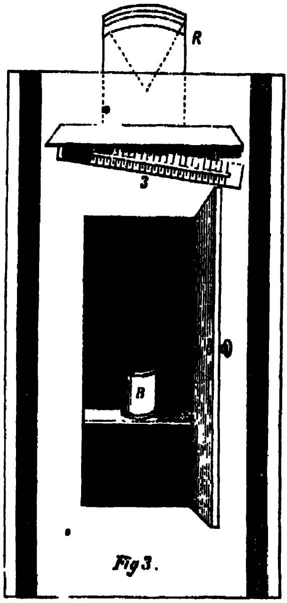

Fig 3.

Figure 1 is a view of the stand. It is composed of *white deal* boards, and can be constructed by any carpenter. It consists of an oblong trunk T, twelve inches by eight inches outside measure, to the opposite sides of which trunk are nailed boards, *b b*, at the distance of three-quarters of an inch, and projecting about six inches from the trunk towards the north. Outside of these are nailed other thin boards, *c c*, full half an inch distant, and projecting about four inches beyond the last mentioned boards, also towards the north. These sides being thus multiple, prevent the sun from heating the interior of the stand, where the thermometers are placed. The top, or pent-board, P, is made double, and the boards are placed fully three-quarters of an inch distant from each other, and come so forward as to overhang by a full inch. The legs, L L, of the stand are merely the continuation of the sides of the trunk. The board, or feet, F F, are loaded or fixed to the ground to sustain the force of the wind. The interior, T, is blackened to prevent strong reflections of light.

Figure 4 is a ground plan, or bird's-eye view of the machine. The sides and wood-work generally are of three-quarter-inch white deal. The distance or space between the sides of the trunk, T (fig. 1), and the board, or inner side, (fig. 4), is three-quarters of an inch; and, the distance from that board to the outer side (fig. 4), is full half an inch. The narrow boards (fig. 4), are to be nailed, with studs intervening, to the middle board or side, and are for the purpose of preventing the sun from shining between the trunk and the sides of the stand, when near the meridian. The sides are fixed one upon another at the required distance (viz., three-quarters of an inch and half an inch), by numerous wooden studs, partially shown at figs. 1 and 2, about three-quarters of an inch diameter, and the screws passed through the sides and studs, fixing the whole firmly together. The whole is to be painted white, except the trunk T, which should be black.

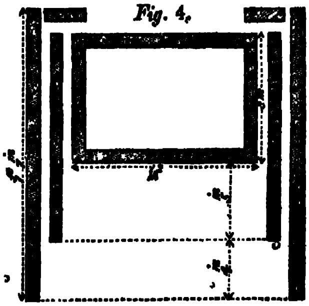
Fig. 4,

Figure 2 is the view of the north side of the stand. No. 1 is an Index Thermometer to give the greatest cold of the night. The thermometer inclines, the ball end being the lowest, in order that the index, by being assisted by gravity, will move more easily. No. 2 is an Index Thermometer to show the greatest heat of the day; for the same reasons it is also placed on an incline, the ball end being the highest. No. 4 are a pair of thermometers called the Wet and Dry Ball Thermometers, to show the power of the air to evaporate water. V is a vase or cistern of water for the Wet Ball Thermometer; it is placed on the outside of the thermometer, to which a cotton wick is to be attached to connect it with the water, and at about the same elevation as the ball of the thermometer, in order that the evaporation from the vessel of water may not influence the thermometer on the other side, which is to be the Dry Ball Thermometer; for, in some careful experiments which I made with a vessel placed beneath the balls, it was found that the dry ball was lowered from 0·2° to 0·3°, which, though apparently a small error, is a serious amount in the mean difference between the readings of the Dry and Wet Ball Thermometers.

Figure 3 is the view of the south side of the stand. No. 3 is an Index Mercurial Thermometer, with a black ball to give the greatest solar heat. R is a Rain-guage on Glaisher's construction, and B is a measure into which rain is to be poured for measurement.

The Rain-guage and Wet and Dry Ball Thermometers will be described more fully in a future paper.

ACTION OF SULPHATE OF IRON ON VEGETATION.[*]

BY M. NAUDIN.

THERE are but few persons, we should think, at the present day, who have not heard of the grand discovery made by M. Eusèbe Gris, of the power of sulphate of iron in rendering diseased plants healthy, especially such as are pale and sickly. Numerous experiments, and in particular those which were instituted at the museum (Paris), by M. Decaisne, have confirmed, in all respects, the facts announced by that acute observer. M. Gris began a new series of experiments on the use of the same salts as restoratives, when, unhappily, death put an end to his labours. His son, M. Arthur Gris, has, however, continued them; and, if he has not, from respect to the memory of his parent, been led to exaggerate the virtues of sulphate of iron, the results he has attained during the year are very remarkable.

On the fourth of May, 1849, when the weather was warm and windy, and indicated the approach of rain, M. A. Gris scattered over six centiares[†] of ground sown with grain, 500 grammes of sulphate of iron, bruised very fine. Two hours afterwards it was dissolved by the rain, and incorporated with the soil. At the gathering of the crops the grain thus treated was cut, and the returns compared with the produce of a similar extent of ground situated near the first and treated in the same manner, but not sulphatized. The precise weights were, respectively, as follows;—one sheaf of wheat, sulphatized, weighed 6 kilogrammes, 500 grammes; one sheaf of wheat, *not* sulphatized, weighed 4 kilogrammes, 500 grammes; when thrashed and cleaned with all the necessary care, they weighed respectively—2 kilogrammes, 420 grammes; and 1 kilogramme, 964 grammes;[‡] thus leaving a difference of about one-third in favour of the crop which had been treated with the sulphate of iron, and that only once. We have omitted to state that all the experiments reported by M. A. Gris have been made, comparatively, on two patches of ground contiguously situated, in the same conditions, and subjected to the same culture, with the exception already mentioned. A similar experiment was made with oats, but it did not admit of being tested fairly, because that portion treated with the sulphate of iron grew so large that it was soon laid, and it was thus impossible to establish any other result than the great development of the stems.

An experiment was also made with a number of melons. Eight plants were placed in an open bed, without any bottom heat, and under large bell-glasses; each was watered with one litre[‡] of sulphatized water. Eight other plants, of equal size, were planted near them, and received the same attention, except that they were only supplied with common water. By the end of June there was a marked difference in favour of the first plants, which set their fruit fifteen days before the others; and in the course of the month of August, the first had attained twice the size. Unfortunately M. Gris had to absent himself about the time the fruit had attained maturity, and was therefore unable to make a definite report of the experiment.

A similar result was obtained from two crops of haricots; and the effects of sulphate of iron have not been less striking with crops of potatoes, not only in the greater number of tubers, but also in their superior quality and colour. Experiments were also made with onions, carrots, asparagus, and cauliflowers, and the like results obtained. Analogous effects were also produced on fruit trees, such as peaches, pears, and vines.

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[*] Abridged from the *Revue Horticole*.

[†] A centiare is equal to 1·196033 square yards.

[‡] A kilogramme is equal to 2.20548 pounds, avoirdupois; and a gramme is a little more than fifteen grains, troy. Probably the French sheaf is less than ours.

[§] A litre is equal to 1.760773 pints.

MYRISTICA MOSCHATA.

Nat. Order.—MYRISTICACEÆ.

GENERIC CHARACTER. — Myristica, *Linnæus.* — *Perigone* simple, coloured, urceolate, or cylindrically-tubular, three-toothed, valvate in æstivation. MASC: *anthers* 6-15, linear, adnate longitudinally to the staminal column. FEM: *ovary* single, one-celled; *ovule* solitary, or sometimes a pair, erect from the base, anatropous; *stigma* two-lobed. *Berry* capsular, two- or sometimes four-valved, one-seeded. *Seed* nut-like, erect, enclosed in a fleshy, much divided arillus. *Embryo* small, at the base of fleshy ruminated albumen; cotyledons divergent, folded; radicle short, inferior.—Trees or shrubs of tropical Asia and America; leaves alternate, shortly stalked, quite entire; flowers axillary or supra-axillary, very rarely terminal; females mostly solitary, more rarely like the males arranged in loose few-flowered bunches or dense capitules, sometimes in racemes, corymbs, or panicles; pedicels with a half-cup-shaped bract near the summit; fruits aromatic or insipid. —(*Endlicher Gen. Pl.* 4706.)

MYRISTICA MOSCHATA, *Thunberg.* — The Nutmeg-tree. — Leaves elliptic-oblong, acuminate, smooth, paler beneath, with simple veins; peduncles few-flowered.

Fig. *a*, male flower; *b*, vertical section of do.; *c*, female flower; *d*, vertical section of do.—The sections somewhat magnified.

DESCRIPTION.—A tree from twenty to twenty-five feet high in its native climate, abounding in yellowish juice. Branches whorled and numerous, with alternate leaves on short stalks, oblong-pointed, smooth, entire, dark green, and somewhat shining above and pale beneath; veins simple and parallel; leaves aromatic when bruised. Flowers in axillary racemes, on glabrous peduncles with a deciduous bract near the summit. Male flowers from three to five on a peduncle: calyx urceolate and petaloid, fleshy and somewhat tomentose outside, pale yellowish and three-cleft; the stamens united into a cylindrical column bearing 6-10 connate, linear-oblong, two-celled anthers, bursting longitudinally. The female flowers frequently solitary, with a short style borne on a broadly ovate germen, and terminating in a two-lobed persistent stigma. Fruit pear-shaped, pendent, having a fleshy pericarp, opening by two nearly longitudinal valves, and abounding in astringent juice; the aril (*mace*) fleshy, much laciniated almost enveloping the nut, of a brilliant scarlet colour when fresh, yellowish-brown and brittle when dry; the nut oval, with a hard, rugged dark-brown, shining shell, marked by the mace, closely enveloping the seed and its inner coat dipping down into the substance of the albumen, giving it a marbled (*ruminated*) appearance. The seed when fresh is quite smooth, but shrivels in drying; its substance or albumen is fleshy and whitish, but traversed by veins of a dark brown colour, abounding in oil. The large fleshy embryo with a hemispheral radicle lies near its base.

HISTORY, &c.—The Nutmeg has been cultivated in English gardens since 1795, but never, we believe, with the success which has been realized at Syon, the noble establishment of His Grace the Duke of Northumberland, whence our drawing was obtained. We learn from Mr. Ivison, the gardener at Syon, that the tree which has produced the fruit from which our drawing was made, is one of half a dozen which were sent to Syon by Dr. Wallich, from the Calcutta Botanic Garden, about twelve years since; they were then very small plants, not more than six inches high. The tree is now fifteen feet high, by six feet in diameter, and is regularly branched from the ground; the habit being very graceful. Mr. Ivison remarks that it is perhaps the largest tree of the kind in Europe.

Several other species of Myristica furnish analogous products, though none of them are equal to M. moschata. The M. tomentosa of Northern India is said to furnish what are called *long* or *male* nutmegs, which, although possessing the same qualities as the genuine kind, are much inferior in flavour; the fruit of M. officinalis is used as a tonic in Brazil; the fruits of M. spuria and M. acuminata are used in the East Indies as substitutes for the true Nutmeg. The coarse unpleasant Nutmegs of Santa Fé are produced by M. Otoba. Some species have insipid nuts, as M. fatua.—A. H.

CULTURE.—We have much pleasure in inserting in this place the following account, by Mr. Ivison, of the treatment which has been adopted at Syon:—

"On the arrival of the young plants from Calcutta, they were potted in Norwood loam and silver sand, and plunged in gentle bottom heat in a low wooden stove, in which situation they remained for nearly a twelvemonth before making any progress. In the following year they made a start, and, by the end of it, it was found necessary to remove them to the tropical fruiting house, in order to give them space to develope their growth.

"As this house, which has a southern aspect, is of rather a peculiar structure, a few remarks upon it may not be out of place. It has a lofty curvilinear metallic roof, a form which is particularly well adapted to catch the rays of the sun during every part of the day; but in consequence of which it would in summer become intensely hot, were it not that a light canvass shading is used during bright sunshine, to modify the heat and prevent the young growth becoming scorched. The heating apparatus for the interior is fitted up on a modification of Penn's system of circulating the warm air; one division being supplied with hot-water tanks under ground, for the purpose of warming the soil, in which some of the spice trees are turned out. The house is separated into three divisions, which arrangement is found particularly convenient in the winter. The Mangosteen, and other plants swelling fruit, can thus be kept by themselves comparatively hot and moist; in a second division, a warm and dry temperature is maintained; and the third is kept cool and dry, for such plants as it is considered safe to subject to that treatment in order to throw them into rest, and to check their growth for the purpose of producing flower buds.

"The Nutmeg plants continued to grow vigorously, and were gradually shifted into larger pots and tubs as they were found to require it, care being always taken to give good drainage and not to injure the young roots. As they increased in size, one half of the soil used was good turfy loam, which had been laid up for some time previous, with plenty of silver sand. The most suitable temperature was found to be a maximum of 90° Fahrenheit in summer, with abundance of water and syringing; and a minimum of about 60° in winter, with comparative dryness; but, in the winter of 1845-6, the division in which they were grown was allowed to be rather more cool than usual, which had the effect of throwing three of the plants into flower in the following spring. As the Nutmeg is a diœcious plant, is was fortunate that one of them produced male flowers, without which there would have been no possibility of fruiting the others. I believe that in Nutmeg plantations in the East Indies, it is customary to plant one male plant to seven females, and to leave the process of fertilization to the air and insects; but in this country under glass no fruit is produced without artificial impregnation, the flowers requiring a very similar process to that adopted with cucumbers and melons that are wanted to produce perfect seed; the only difference being that both kinds of flowers are produced on the same plant in the cucumber and its allies; while the Myristica produces them on separate plants. About twelve months elapse from the time the fruit is set until it is ripe; but, in the meantime, a second crop of fruit and a third of flowers, is produced: in fact, the plants flower regularly in the spring and autumn months. I need hardly remark that the Mace and Nutmegs gathered fresh from the trees are much higher flavoured than those imported to the shops, which may be accounted for by their not having to undergo the preparing process necessary for exportation.

"When the Nutmegs from Syon were exhibited at the rooms of the Horticultural Society, it was remarked that it was perhaps the first time this spice tree had fruited in England. Before the fruit opens it looks not unlike a little pear, but, as maturity approaches, the outside coating is burst into two halves, displaying to view a reddish purple body something like a plum, and within this, which after a certain process becomes the Mace of the shops, the true Nutmeg is enclosed. The fruit is about as large as a good sized fig, and perhaps more pear-shaped or rather round. There is a larger variety of the Nutmeg at Syon, which has also borne fruit; in this, the fruit is much more round in form than in the common variety, and has, before it opens, very much the appearance of a good-sized peach."

Vegetable Physiology.

By ARTHUR HENFREY, Esq., F.L.S., Lecturer on Botany at St. George's Hospital.

THE CONTENTS OF THE ELEMENTARY STRUCTURES OF PLANTS.

WE shall dismiss the subject of the minute anatomy of plants with the present chapter, in which the most important of the various matters contained in plants will be briefly described. More extended information will come into place better hereafter, when we examine the characters of the vital operations.

The substance of every living plant is wholly pervaded (excepting, of course, the epidermis and bark structure) with liquid, which, constantly rising up from the roots towards the upper parts, the leaves and flowers, where it is evaporated during the active vegetation of the plant, carries with it the various substances taken up in solution from the soil. But this liquid does not pass through open conduits, and is not conveyed up unaltered, but passes through the cellular tissues, which take from it certain substances, and give out others; so that this general sap probably differs in its actual composition in every different part of a plant, according to the operations going on in the tissues which it traverses.

The proper contents of plants do not form part of this fluid. They are contained in the cells, the little closed vesicles, and they are here frequently so completely retained, by some at present mysterious influence, that two of these little vesicles, whose membranes are freely penetrated by water, stand side by side, filled with most different matters, which never become intermixed. Each cell is, as it were, a little laboratory, in which it extracts from the constantly passing current of sap those constituents it requires for its own products; and when those products are completed, it either sends them on again in the fluid, or reserves them in store for a future need of some other part of the plant, or uses them to increase its own solidity, as in the formation of the thickening layers. It is probable, however, that the thickening layers in the older woody parts, are drawn from juices which have been elaborated in some other part of the structures.

Young cells are found to contain at first only a colourless or yellowish viscid fluid, somewhat resembling white of egg in its character, being readily coagulated; this soon becomes granular, and after a time, as the cell grows, is found mostly as a layer spread over the inside of the cells. It is only so long as they retain this condition that they are capable of multiplying. If they are to be wood-cells, they soon lose this substance; but if they are to be "working" cells, as we may term them, as in the leaves, and young roots, they retain it. In these we soon find starch grains; at first, small and few, then gradually increasing in number. After these come, in the green parts, chlorophyll granules, little round grains, or globules, of a green colour, and of a fatty nature. Although these substances form the most important matters of the cell-contents that can be detected by the microscope; yet, in the general liquid, are found dissolved sugar and gummy matters, which are equally essentially concerned in the nutrition of plants.

The real history of these products is yet to be made out; but we do already possess many contributions to it, and an approximative view of the process of nutrition may be expressed as follows:—

We know that plants require water, carbonic acid, and ammonia, for their growth, besides certain earthy and alkaline substances, which may be left out of view for the present. Water is composed of oxygen and hydrogen; carbonic acid of carbon and oxygen; ammonia of hydrogen and nitrogen. The viscid fluid or mucus contained in all active cells, is composed of oxygen, hydrogen, carbon, and nitrogen, and is, therefore, readily produced from the fluid containing all these elements absorbed by the roots. The membranes and woody thickening layers of the tissues, starch, sugar, and dextrine (the gummy matter), are composed of oxygen, hydrogen, and carbon, and are probably secreted or thrown off by the mucus, having passed through that stage first. While the plant is growing actively, the mucus matter is continually receiving new supplies of carbonic acid and water, from which the membranes, sugar, and dextrine, may be formed; while the ammonia, received in smaller quantity, permits the increase of mucus itself to furnish contents for *new cells*. But the supply being still greater than the demand for the products in the shape of cell membrane, or mucus, a large portion of the material for the first is stored up in the form of starch grains, and of the fatty matter, of which the chlorophyll globules chiefly consist; while the nitrogenous matters are deposited in the shape of the green colouring matter of chlorophyll, which is composed of all four elements: these processes being accompanied by the separation of oxygen, and going on under the influence of the sun's rays. The mucus and the sugar and gum are carried freely onward in the flow of the general liquid upward. The starch and chlorophyll remain in a solid form in their cells until wanted, increasing in abundance according to the healthy vegetation of the plant. In autumn the starch begins to disappear from the leaves, being dissolved into gum or sugar, and carried into the buds, the tubers if present, into the roots or bark; in fact, into any part which may be peculiarly the reservoir of nutrition for the new products in the following spring; of course, also into the seeds, where it is again deposited either in the shape of starch, or of fixed oils (which are analogous in composition), or of soft cellular substance, nearly filling up the cells, and capable of being re-dissolved, like starch in the spring. The leaves lose their green colour at the same time; but this is at present a mysterious point, for the chlorophyll is not absolutely and wholly removed, the fatty substance, of a yellowish or reddish colour, remaining after the loss of the green colour by the dead leaves.

Thus carbonic acid and water, mixed with certain earthy salts, are absorbed by the roots, the mucus is continually increasing these in the rapidly multiplying cells of the delicate tissue of the extremities of the roots; from these the sap pours onwards by endosmose throughout the whole structure of the plant, until it reaches the evaporating surfaces of the leaves or green stem; in its transit the wood-cells subtract from it the ternary compounds of oxygen, hydrogen, and carbon, from which are produced the new layers of cellular membrane, increasing the thickness of their walls. The green layer beneath the bark, and the tissue of the leaves, elaborate the same substances into starch and oily matters; while a further portion of the absorbed substances is converted into new mucus to fill the newly produced cells of the growing buds, and into chlorophyll, which is a kind of fat accumulated in the interior of the old cells.

The starch and nitrogenous matters which are lost from the green organs in the autumn are merely removed into another part, and converted into new products. The starch which has been accumulated in the seeds, tubers, buds, or other parts, is dissolved in the spring, and furnishes the material for fresh development; the young plant from the seed, the nascent shoot from the bud. All the new structures making their appearance under the genial influence of the awakening season, are derived from the provision of the preceding season, since they become considerably developed before the new roots have grown sufficiently to supply them adequately with newly elaborated nutriment.

The green parts of vegetables give off oxygen continually under the influence of the sun's rays, or even in diffused daylight. This is a fact which has been long decided; but the explanation of it is by no means clear at present. The "becoming green" is not the essential point, since it is proved by experiment that the green matter is exceedingly small in quantity; moreover colourless or yellowish globules are produced in the dark, which are greened by the action of light. The received opinion is that the accumulated nutriment—the starch answering to the fat of animals—is formed independently of light; but, in proportion to the degree of light obtained by the plant, this starch becomes more or less converted into fatty or oily matters, losing oxygen in the change; and under direct sunlight this oxygen is given off so abundantly as to oxidize the colourless chlorophyll which forms a layer over the changing starch globules. We cannot venture to give a decided opinion on the real nature of the changes; but there is no doubt about the general result of the action of light. Growth can go on without it, and to a great extent, as we see in subterranean stems, in the leaf-stalks of Celery, blanched Endive, forced Rhubarb, and the like, where abundance of nitrogenous matters are furnished by highly manuring the soil; but in all these cases there is a deficiency of the active products of the tissues; the cells do not become woody, but remain soft and succulent; the strong principles which give the peculiar character to particular plants are not developed; the white Celery-stalks have little of the acrid matter which is so abundant in the wild Celery, and the blanched Endive has but a slight trace of its naturally strong bitter principle; and we find the influence of deficiency of light even in the development of the tropical fruits under the moderated action of the sun's light in our stoves.

On the other hand, the aromatic herbs increase in abundance as wild weeds, as we approach warmer climates; even with us the "wild thyme" and its allies are characteristic of dry, sunny banks, and the occasion of a hot and bright summer is always marked by a deeper colour of the foliage of our trees.

The action of the sun is therefore, on the whole, that of fixing carbon, and also nitrogen in the tissues of plants, so that, as a practical conclusion, we shall always endeavour to obtain for our cultivated vegetables increase of light when we wish them to develope their active properties, and to *accumulate* elaborated food, either in the shape of woody tissue, of starch, or of the various oils, active or aromatic principles; and moreover, when we wish them to produce seeds, since they can only effect this highest operation of development when they have had the opportunity of laying up a store of nutriment to supply the excessive requirements of this process. How great these requirements are is proved by all experience; the flowers and seeds of annuals are only produced in the later seasons of the year; biennials require the accumulation of two years; perennials seldom flower for several years under ordinary circumstances, and then, when the product of seeds is very large, the operation is sometimes followed by the death of the exhausted plant, as in many Monocotyledons, such as the Talipot Palm, the American Aloe, &c.

These summary views are sufficient to give some notion of the general operations of vegetable life; when we enter into the minutiæ of special processes, the particulars become much more complicated. We shall therefore treat of them separately hereafter; and the continuation of our papers on Vegetable Physiology will now pass from the abstract character which they have hitherto necessarily assumed, into the more definite form of chapters upon the particular operations of vegetation performed by the different organs, such as the roots, leaves, flowers, fruits, &c,

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Reviews.

The Royal Water Lily of South America, and the Water Lilies of our own Land: their History and Cultivation. By GEORGE LAWSON, F.B.S., &c. Edinburgh: HOGG. London: GROOMBRIDGE.

WE are glad to find that our correspondent, Mr. Lawson, has, in the little volume before us, provided for the million, in the form of a very elegant and very cheap book, a trustworthy, readable statement of all that is known respecting the Floral Queen of the waters—the Victoria regia; and has also taken the opportunity to put in a plea for the charming Lilies which adorn our own lakes and rivers, as the Royal Water Lily does the still waters of the tropical parts of the new world. We find here detailed all that has been made known respecting the Victoria; and there is also a very passable, though much reduced coloured lithograph, representing its aspect in its native scenes. The account of the English Water Lilies is illustrated by a coloured portrait, in a similar style, of our own white Nymphæa. We recommend Mr. Lawson's hints for the more extended cultivation of ornamental aquatics, to the especial attention of our readers. Water and water plants, indeed, afford ample material for an improved arrangement of our plant structures, which, as Mr. Lawson remarks, have hitherto retained the stiffness and formality of former times, now almost banished from our out-door flower gardens. The discussion as to the proper name of the Victoria, referred to at p. 168, seems now to result in the confirmation of the name—Victoria regia.—M.

Glenny's Hand-book to the Fruit and Vegetable Garden, &c. By GEORGE GLENNY, F.H.S., &c. London: C. Cox.

THIS volume treats, in a plain and homely way, of the cultivation of those crops which are usually met with in the kitchen and fruit gardens, and takes in some others of which the names are more familiar than the culinary articles they represent. Good select lists of vegetables and fruits are given. The cultural directions are framed for the use of those who are their own gardeners, and are generally plain, and to be depended on. We must, however, find fault with the arrangement of the matter, which is miscellaneous and unmeaning.—M.

The Beauties of Middlesex: being a particular Description of the principal Seats of the Nobility and Gentry in the County of Middlesex. By WILLIAM KEANE. Chelsea: printed for the Author.

THIS little book takes up the subject indicated in its title from a gardening point of view. It is an interesting work of reference, and a register of the present character of the principal gardens in the metropolitan county, and is modelled after the plan of the *Beauties of Surrey*, published a year or two since by the same author. The volume is interspersed with many highly useful and instructive remarks of a critical bearing. We quite agree with a remark of our contemporary, the *Cottage Gardener*, that the two hundred or more residences here described, taken as an average of the counties of England, give a cheering view of the more than ten thousand "stately homes of England"—each a centre of improvement and refinement, and tending to elevate the scale of gardening, and increase the home attractions, even in the poorest of adjoining neighbourhoods. The book under notice is not so free from typographical errors as we could wish.—M.

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THE RONDELETIA SPECIOSA MAJOR AS A "SPECIMEN" PLANT.

BY MR. WM. RUMBY, CHATSWORTH.

THAT this plant possesses capabilities of no ordinary character, as adapted for decorative purposes, will be questioned by few. Even in its natural state, in which no recognition of the hand of art is perceptible in regard to training, it possesses considerable attractions. In a collection of stove plants, its brilliant trusses of orange scarlet blossoms, are generally the first objects that engage attention. In addition to the attractive features of this Rondeletia when in bloom, it possesses intrinsic merits, which contribute very much to increase the value of it as a "specimen" plant; the great substance of the petals give it a decided superiority over those that are of a more "flimsy" character, rendering it capable of resisting for a longer period the tarnishing effects of the solar rays, and also of the humidity prevalent in plant stoves from physical causes. The facility with which it may be induced to flower at any season of the year, through a suspension of the system of "stopping," which is one of the most essential points in its culture, is a consideration of no trivial importance. Some persons might imagine that, from its straggling habit of growth, it would be difficult to form this plant into a compact bushy specimen, but this may easily be effected by the aid of art. Indeed it is on such objects as the subject of these remarks, that a practical demonstration of what art can accomplish in modifying natural tendencies, when found incompatible with the highest degree of floral development, is most strikingly displayed.

In order to obtain the highest possible cultural results in plants, natives of warm climes, which are cultivated for floral display, there are certain principles which it is indispensable should be recognized, that upon them may be based such a system of cultivation as is consonant with sound deductions therefrom. It is an axiom in horticulture, that the causes combining in producing the highest degree of accumulative vigour in plants are of a contrary character to those which induce the highest state of fertility; hence the paramount importance of a modification of the former causes, to the production of the latter. It is a well ascertained fact, corroborated by evidence furnished from daily experience, that plants possessing a tendency to bloom in a comparatively young state, before they have attained a large amount of growth, are impeded in their progressive vigour in proportion to the amount of bloom developed, from the appropriation by the flowers of the organizable matter which would otherwise have been made available in the formation of young shoots. Hence the expediency of securing, in the primary stages of growth, and previously to the period when the floral hues are unfolded, such an extent of growth as is adequate to the result required, by a judicious application of the great agents essential to the production of luxuriant vegetation. To accomplish this in an effectual manner, it is requisite to possess an intimate acquaintance with the climatic conditions of the native habitats of plants; which, in the case of the Rondeletia speciosa, of which major is a variety, is Cuba, situated in 20° to 23° North latitude, having an average temperature of about 76° Fahrenheit. In so warm a clime, the period of growth is characterised by a large amount of heat and moisture, the amount of rain which falls being comparatively very great to that which occurs in Britain, producing a great amount of evaporation, which, combined with the amount of evaporation from its contiguity with the ocean, furnishes a very humid atmosphere in which vegetation flourishes with a degree of vigour of which we can have but a faint conception in temperate climes. Glancing at the period of rest in tropical countries we find it characterized by much drought and heat, which in the all-wise economy of nature has the effect of producing the like results on tropical vegetation, which a material lowering of temperature under a very small amount of solar heat has in temperate climes. Now, in an exact ratio as an approximation is made to the natural conditions under which the greatest amount of vigour is attained, and a modification of them essential to the production of a thorough elaboration of the vegetable juices which have been adverted to, will be our amount of success; apportioning the amount of heat in the latter instance to the amount of light.

From these premises I will proceed to describe briefly a system of treatment based on the principle involved therein. Some time in the spring, when the young plants are struck and ready to pot from the cutting pot, put them into three-inch pots in a mixture of two-thirds peat and one-third turfy loam, with some silver sand; they should then be placed in a span-roofed pit, and stopped at the third joint from the base of the shoots, and plunged in a warm medium over a hot-water tank, that root action may be excited, and an imitation of the terrestrial temperature in the tropics, which exceeds very much that of the atmosphere—may be produced. The temperature of the plunging medium may be 80° Fahr., and the atmospherical from 70° to 85°, varying the amount according to the degree of solar heat, with a nocturnal temperature of 60° to 65°. As the incipient buds break, and the young shoots become developed, a portion of air should be admitted to induce them to assume a robust habit of growth. Syringings should be given them morning and evening, and the pit closed early in the afternoon to keep up a warm humid atmospheric medium around the plants. After the pots are filled with roots, and before becoming cramped, they may be potted into five-inch pots in the following materials intimately blended:—One-third turfy loam from an old pasture, the turf in a partial state of decomposition, one-third fibrous peat, and one-third good rotten dung, with a portion of charcoal in small pieces, and silver sand. They should then be replaced in the pit and partially plunged. Whent he shoots have attained four inches in length, they may have the points pinched out, and this system of stopping should be repeated till the plants are of the required size—that is, say five or six times, never allowing the shoots to grow above four inches betwixt the periods at which such operation is performed. If the plants are required to bloom in the spring, stopping may be discontinued at the termination of the second autumn.

As the plants increase in size, after the second potting, they should be repotted when they require it, using the materials in a coarser state than previously, to secure the requisite degree of porosity in the soil, and to make it permeable to air and water, which is of the utmost importance. They must be kept growing under precisely the same conditions as heretofore, excepting that more air be given as the plants increase in size; and weak liquid manure, in a highly clarified condition, may be supplied once a fortnight to the plants; which will accelerate their growth very much. As autumn approaches, the plants may be removed to where there is a drier atmosphere,—a span-roofed stove for instance,—less humidity kept up, and the supply of water reduced, with a gradual reduction of temperature, till it recedes to from 60° to 70° by day; and 55° to 60° night. This will be found sufficiently high during the season of comparative repose, till the vivifying influences of the great source of light, heat, and vitality, arouse the vital functions to renewed activity; when the treatment before described may be again resorted to, potting the plants as they require it. When the plants have undergone their last stopping, a reversal of these conditions is necessary: the plants may be allowed to become cramped at the roots, the humidity both of the soil and atmosphere should be reduced, and waterings of liquid manure discontinued, till all the flower buds are distinctly visible; when they may be renewed in a copious manner. A splendid display of bloom will be the ultimate result of this system of management.

Miscellaneous Notices.

Large Rose Trees.—I have often heard amateurs, when admiring some of the large specimens in the nurseries here, express astonishment at their prodigious size, which they attribute to their great age, and good soil. But it must be told, that the system of pruning has as much to do in this matter as the age of the trees, or the soil in which they grow. The oldest of the large trees here cannot number more than twelve years, though there are others much older not half the size. Often have I seen Rose trees full of shoots, nearly all proceeding from the base of the head, owing principally to close pruning. When the knife is applied, whether in autumn or in spring, the greater part must be removed, for there is not room enough for the whole to be developed. Now, it is not the production of a number of branches I consider injurious: if the tree is in a healthy and vigorous condition this is natural and advantageous. But why should they not be obtained in such positions that they may be of permanent benefit to the plant—be made to extend its size, and render less thinning necessary? This may be done. Two years ago, after having pruned a number of large specimens in which I had observed this error, I watched for the bursting of the buds, with the view of practising disbudding. When they had shot forth about half an inch, I took a knife with a sharp point and commenced my search at the heart of the tree. From here I rubbed off, close to the bark, a great number of buds, leaving only such as, from their position, promised to increase the size or improve the contour of the head. If a bud was pushing where there was a gap, such was left; the others were thinned, leaving those which took a lateral and outward course of growth. Proceeding upwards, I cleared the centre of the tree pretty freely, leaving only just so many buds as seemed necessary to preserve it from becoming straggling. Towards the top and circumference, also, the buds, where crowded or likely to cross each other, were removed. A month after the first looking over, fresh buds had broken, and thus was opened a prospect of more gaps being filled, the outlines of the heads being still improved, and their size extended. They were looked over again and again, and the same plan followed out. The growth was in consequence more vigorous than that of the previous year, and the flowers fine. On the fall of the leaf in autumn, the succeeding course of action was apparent. The trees were pruned as usual, and there was little mind exercised in the operation—little thinning required—no necessity to look at the tree for some minutes before one could determine where to begin; which, in my early attempts, I must confess, I have often done, owing to the interminable interlacings of the shoots. The second and third year the same plan was followed, and the trees are now of handsome form, large and healthy, producing an abundance of good flowers. It should be stated that the first year they were taken in hand, they were watered once a-week for two months with liquid manure. The sole reason for this was that the soil in which they grew had become impoverished. We apply the plan of disbudding to pillar and weeping roses, as to others, by rubbing out any buds that may appear disadvantageously situated. In the youngest stage of the tree, the buds left to produce flowers and flowering shoots for the subsequent year, should stand about six inches apart on the main branches: intermediate buds should be rubbed out. The laterals produced in after stages may also be disbudded; but masses of flower being the object sought here, the practice should not be too freely resorted to. A few words on summer pruning or thinning seem called for. If disbudding can be carried out there is no need of summer thinning; but, if it cannot be, then the latter practice may be followed to advantage. So soon as the plants have done flowering look them carefully over, thin out the weak unhealthy shoots, and even some of the stout and healthy ones, where they approach each other too nearly: each shoot should stand free and exposed on every side. It is surprising to see how stout and firm the shoots become, and how the leaves increase in size after summer thinning. The summer kinds submitted to this treatment usually continue their growth by the elongation of the main shoots, the buds on the axils of the leaves remaining dormant; but, with the autumnals, the buds push forth the entire length of the shoots, and the second flowering is complete. The trees are improved in both cases, for the shoots grown at this period will produce the finest flowers in the subsequent season.—*Paul's Rose Garden.*

The genus Chrysothemis.—M. Decaine, who has made the Gesneraceous plants his particular study, separates from the genus Besleria, some species which had become associated with them. He defines the genus as having a campanulate calyx with five teeth, to the sinuses of which correspond as many more or less prominent wings, a corolla nearly regular with two projecting folds on its lower lip, included stamens, two-lobed stigmas, and a notched fleshy glandular disk. It includes three species, of which the author has given the following account:—"Chrysothemis aurantiaca is a herbaceous plant, received from the Antilles. It grows with a stout fleshy glabrous stem about two feet high, having some resemblance to the stems of some Labiatæ or Scrophularineæ; it is green, and clothed with fine whitish down. The leaves are opposite, large, oval elliptical, acuminate, crenulate, bullated, clothed on both sides with very short bright hairs, especially on the upper side, of a glaucous green below; they are attached by a robust fleshy and canaliculate petiole. The peduncles which issue at the axils of the leaves are cylindrical, and terminated by a cyme of three flowers, having the pedicels purplish, and accompanied by lanceolate bracts. The calyx is campanulate, of five unequally toothed segments, and of a cinnabar colour, pubescent, and presenting in their length five prominent angles. The corolla is slightly bilabiate, velvety at the outside, glabrous at the inside, having a tube which extends beyond that of the calyx, and a limb with five rounded lobes of a bright yellow colour, having several dotted lines of carmine on the face. The stamens and style are enclosed. The ovary slightly angular and velvety, has, at the base, a broad fleshy gland furnished with three small lobes. Chrysothemis aurantiaca thrives in a mixture of peat and loam. It should be grown in the shade, and a humid atmosphere. It flowers without intermission from August till the end of October, after which it should be allowed to rest, and does not require any particular care; but in abstaining from supplying it with water, the soil should not be allowed to get too dry. Of the two other species of the same genus, one C. venosa, *Dne.* (*Besleria melissæfolia*) has the calyx greenish, and somewhat similar to that of Sinningia; the other, C. pulchella *Dne.* (*Besleria pulchella*), on the contrary, has the calyx of a carmine red, and almost entire. The colour of this part of the flower will therefore be sufficient to characterise and identify, without difficulty, the three species which at present constitute the genus Chrysothemis.—*Revue Horticole.*

NEW CONTINENTAL FRUITS.

CURRANTS.

Gonduin or *Gondouin.*—This Currant is of vigorous habit; the leaves resemble those of the Vine, their medium breadth is about three inches, and they are five-lobed; the bunches measure four inches in length, and bear, on an average, twenty-five berries, each a quarter of an inch in diameter, and of a vermilion-red colour. This variety is produced from seed with the same qualities, as we have proved for ourselves.

White Pearl of Dielighem.—This excellent white variety was raised from seed. The bunches are four inches long, and bear generally from twenty-six to thirty berries. The berry is spherical, a quarter of an inch in diameter. The seeds perceptible through the epicarp, the eye somewhat dark, and the whole berry like a beautiful pearl. It is the best white variety in cultivation, and was raised by M. Remi Wilquet, gardener, at Jette near Brussels.—*La Belgique Horticole.*

STRAWBERRIES.

Naimette.—The fruit of this is perfectly round, and does not attain a great size, measuring only about three-quarters of an inch long, and a little more in diameter. In form it is ovoid, nearly spherical, and regular; the calyx has from fifteen to twenty lanceolate sepals; the peduncle is thick and hairy. The colour of the berry is purple tinged with a vinous violet; the seeds prominent and red. The odour is vinous and very good; the flesh juicy and rose-coloured; the taste is sweet, very vinous, and having a grateful aroma. We name it *Fraise Naimette*, from the locality whence it was obtained. It was raised by M. Lorio, Rue Naimette, Liége, in 1850.

Lorio.—This variety is named after the raiser, M. Lorio, of Liége. It is of the large class of Strawberries, the medium size of the fruit being fully an inch and a half in diameter, and about an inch between the apex and the stalk. In general form it is rhomboid, which is rather rare in this fruit, and appears as if two berries were growing together; those of less size are almost square. The calyx has from fifteen to twenty-five adpressed sepals. The fruit is purple; the seeds prominent and red; the flesh rose-coloured, with a zone of red towards the epicarp, firm and juicy, having a small cavity in the centre. The flavour is fresh, sweet, aromatic, slightly musky. The habit is robust; the leaves large, hairy, and much dentated.—*La Belgique Horticole.*

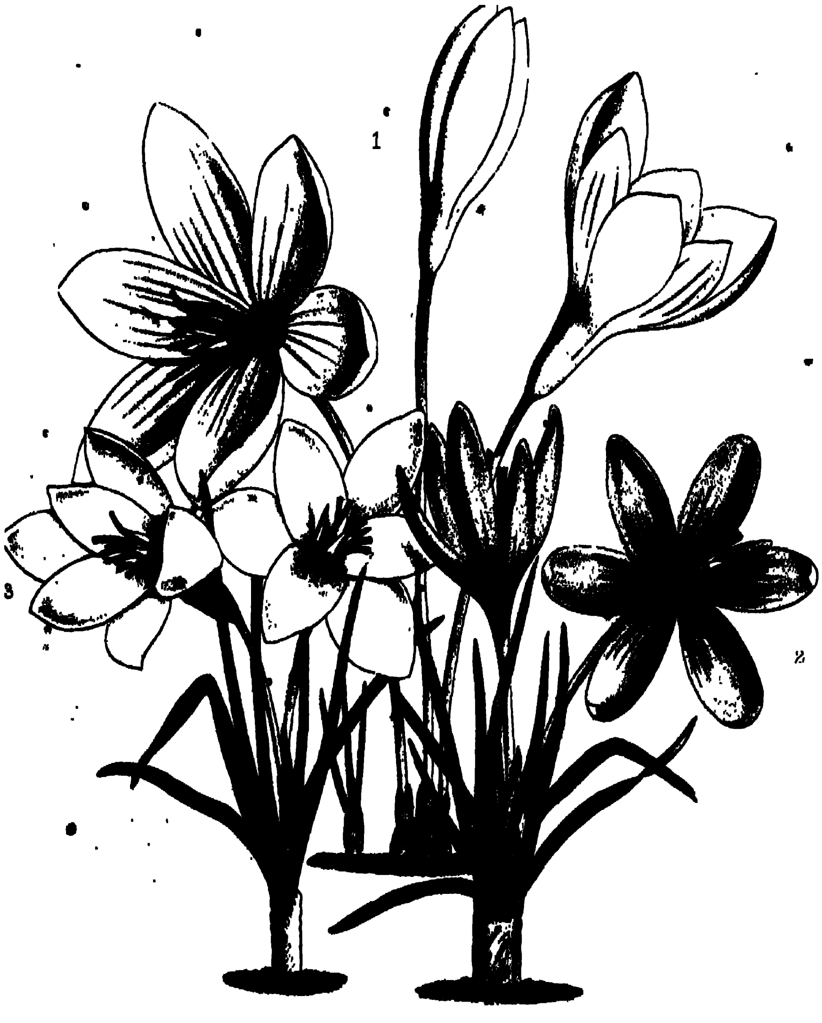
GOOSEBERRIES.

Prune de Gathoye.—This Gooseberry was raised from seed by M. Gathoye, horticulturist at Liége, a very successful raiser of fruits. A red-fruited English variety was sown in dry stony soil, near the banks of the Meuse, and having a south aspect. The berry measures about an inch and a half in length, and an inch and a quarter in diameter. It is ovate-elongate, the peduncle thick and short; from eight to ten large and prominent veins appear on the exterior surface, which is studded with numerous short black hairs. The epicarp is of a sanguineous red passing to violet, and having a shade of pale rose. The flesh is green at the exterior, the taste is sweet, the juice abundant, and the aroma delicate. The fruit ripens in July.

Reine Claude de Gathoye.—The fruit is of an elliptical globular form, slightly depressed at the eye and stalk. The transverse diameter measures about an inch and a quarter. The colour is a clear golden yellow; the nerves are pale, and there are a few red spots at the summit. It has few hairs, and the peduncle is about an inch and a half long. The flesh is all yellow, slightly green at the exterior; the taste delicious; the aroma grateful. This is certainly one of the best Gooseberries that can be grown. The whole plant has a yellowish aspect. Raised by M. Gathoye from seed, and is yet very little known.—*La Belgique Horticole.*

FIG.

Grosse superfine de la Saussaye.—This variety, which was raised by M. Croux, nurseryman at La Saussaye, in Villejuif, near Paris, is a most excellent fruit, attaining perfect maturity in the climate of Paris. The fruit, in an early stage, is pyriform, and measures about three inches and a half long and two inches and a half broad. It has numerous prominent ridges extending from the apex to the stalk, and sometimes becoming ramified. When mature, it becomes much broader towards the peduncle, and then takes an oblong form; the ridges also are less prominent or entirely disappear. The skin is violet, marbled with pale green, and marked with numerous small, oblong, greenish-yellow spots, and having a slight bloom. The flesh is soft, juicy, and agreeably flavoured—yellowish green, with reddish seeds. This fig differs essentially from the Violette Poire de Bordeaux, and Violette longue, or Grosse Figue aulique, by its flesh being greenish,—a character which brings it near the Cucu de Muelo of the southern provinces (cul-de-mulet); but the latter is of a lively reddish brown. The present variety then, is quite new, and much superior to those usually grown round Paris.—*Revue Horticole.*



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1 Crocus pulchellus 2. C Cartwrightianus 3 C. Boryanus

AUTUMNAL CROCUSES.

Nat. Order.—IRIDACEÆ.

Generic Character.—Crocus, *Tournefort.*—*Perigone* coralline, superior, funnel-shaped, the tube elongated, the limb six-parted, the interior lobes (petals) smaller, erecto-patent. *Stamens* three, inserted in the throat of the perigone, erect, included; *filaments* thread-like; *anthers* arrow-shaped, affixed by the base. *Ovary* inferior, obtusely three-sided, three-celled; *ovules* numerous, in two rows in the inner angle of each cell, ascending, anatropous; *style* thread-like, elongated; *stigmas* three, dilated, wedge-shaped, fleshy, hooded, and finely toothed at the apex. *Capsule* membranous, three-sided, three-celled, loculicidally three-valved. *Seeds* numerous, sub-globose, the *testa* leathery, slightly fleshy, finely wrinkled at the hilum, the slender raphe excurrent at the apical chalaza. *Embryo* axile, much shorter than the horny albumen, the radicle extremity turned towards the hilum below.—Stemless herbs, native of Europe, Central Asia, and the Mediterranean region; leaves narrowly linear; flowers radical, large and showy; ovaries in some degree subterranean; certain species cultivated for the peculiar qualities of the stigmas (saffron).—(*Endlicher*, *Gen. Plantarum*, 1248.)

Division I.—*Involucrati.*—Crocuses having an involucre below the flower. Sect. 5. *Reticulati:* bulb-coats reticulatrd.

Crocus Cartwrightianus, *Herbert.*—Cartwright's Crocus (Fig. 2).—Coats of the corm all softly membranous, reticulated with fine fibres above on the outside, (obsolete coats at length with parallel fibres below), the sheathing coats about five in number, two affixed near the base, the zone of the roots situated between them, a third sometimes higher, interior, affixed to the middle of the corm, the two nearest to the foliaceous coats often spirally connate at the base; the foliaceous coats all elongated, broadly and flatly apiculate, the exterior affixed a quarter of an inch below the apex, the third and fourth connate (always?) at the sheaths, the fifth semicircular at the base; leaves 6-8 or fewer, narrow, with the reflexed margin and the dorsal rib, densely ciliate, veins very slightly grooved, developed before the flowers, subsequently spread out and prostrate; involucre two-flowered (flowers sometimes simultaneous), little shorter than the transparent spathe; bract acute, rolled round the tube, not tubular, equalling the spathe, growing white on the germen; tube exserted one and a half inch; limb white or purpurascent, veins deep or pale purple at the base of the petals, the throat purpurascent outside and white within; beard white, petaloid, bases of sepals smooth; filaments white, smooth, inserted a quarter of an inch below the throat, anthers golden-yellow, more than three-quarters of an inch long; style truncate, scented, deep scarlet, the lobes divided to the throat of the tube, thickened above, stigmas shortly incised; seeds brownish-purple, large in this genus, angularly roundish.—*Herbert* in *Journal of the Horticultural Society*, ii., 264.

Division III.—*Nudiflori.*—Crocuses having no involucre. Sect. 2. *Parallelo-fibrosi:* bulb-coats with parallel fibres.

Crocus pulchellus, *Herbert.*—Pretty Crocus (Fig. 1).—Principal coat of the corm membranous, with a ring at the circumcissile base ciliated with fibres; spathe concealed; bract broad, strap-shaped, scarcely equalling the spathe; tube slender, exserted two and a half inches; limb one inch or more in length, pale cærulescent, veins deeper; throat slightly bearded, orange-coloured; filaments saffron-yellow, minutely hispid; stigmas multifid, pale saffron-coloured, finally surpassing the white anthers; leaves broad, green, smooth, with a white streak; seeds small, roundish.—*Herb. l. c.*

Crocus Boryanus, *Gay.*—Bory's Crocus (Fig. 3).—Sheathing coats two, persistent, affixed near the base, smooth, soft, at length parallelly lacerated below; outer foliaceous smooth, affixed about or below the middle; spathe acute, about equalling the bract, germen pale, partly or commonly quite exserted with the scape; tube white, more than two inches long, free; limb one or more than two inches long, white or rather cream-coloured, the lobes often with three purple streaks on the outside at the base, rarely throughout the whole length; throat orange within, pubescent at the base of the petals; filaments inserted at the mouth of the tube, yellow, pubescent, a quarter of an inch long, anthers about three-eighths of an inch, white; not equalling, or rarely, the slenderly and deeply multifid, straight, more or less deep orange-scarlet stigmas; leaves 4-8, narrow, smooth, a little preceding the rather late autumnal blossoms; flowers 1-5, three nearly simultaneous; capsules small; seeds small, pyriform, chestnut-brown.—*Herb. l. c.*

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[*] Syn.—C. Boryanus, *Gay;* C. ionicus, *Herbert;* C. veneris, *Tappeiner;* C. caspius, *Fischer in Herb.*—A. H.

DESCRIPTION.—Very ornamental dwarf herbs having solid bulbs or corms, grassy foliage, and showy flowers. C. Cartwrightianus (fig. 2) is a rather small dwarf species, growing about three inches high, and varying much in the colour of its flowers, which are usually white, more or less stained inside with purple lines, sometimes pure white, often of a pale, and sometimes a pretty rich purple; the throat is never yellow. It is a free flowering variety, the blossoms being fragrant, and expanding readily at the dull cheerless season in which they are produced, which is usually October and November; though sometimes, according to Dr. Herbert, extending to January. C. pulchellus (fig. 1) is a larger and more showy kind, growing four or five inches high, the flowers appearing quite before the leaves; the colour is a pale bluish pearl-colour with darker veins, the throat orange yellow, and the anthers white. It appears to be a very free grower, producing its flowers early in October. C. Boryanus (fig. 3) grows from three to four inches high, and has moderate sized flowers of a creamy white, the throat orange yellow, and the anthers white, the deep orange-scarlet stigmas being rendered very conspicuous by the pale ground-colour of the flowers; in some of the varieties, the base of the segments of the limb is marked externally with dull purple lines. It is a late autumnal species, flowering towards the end of October and in November.

History, &c.—These beautiful autumnal crocuses, along with several other equally ornamental species, have been within the last few years collected together, and brought into notice by the lamented Dr. Herbert, who cultivated a most interesting collection of them in his garden at Spofforth, and made them a peculiar study, the result of which appears in a valuable paper on the species of Crocus published in the *Journal of the Horticultural Society* in 1847.

They are as yet rare, though, as they have proved cultivable, we may hope to see them become more common in the course of a few years, the more especially as some of them produce seed freely. Our present subjects are natives of Asia Minor or of neighbouring countries; and we believe were all introduced shortly before his death by Dr. Herbert. C. Cartwrightianus is found in the Greek islands Teno and Scyro. C. pulchellus comes from Belgrade, as well as the east side of the Bosphorus, and Mount Athos. C. Boryanus is found in Asia Minor, the Morea, and the Greek Islands.

CULTURE.—These Crocuses grow freely in a rather dry deep loamy soil, and may be regarded as hardy in our climate, if they are preserved from the injurious influences of over-wetness in the soil; though, as their vegetative development takes place during our most inclement weather, it may be proper to give them a sheltered situation, such as the foot of a wall or building. Until they become much more abundant, however, they can hardly have much influence on out-door gardening; but they are invaluable as pot plants for the decoration of greenhouses and sitting rooms during the later autumnal months, when few flowers remain. In pot-culture they should have good sized well drained pots of sandy loam and leaf-mould, and should be grown in a cold frame, whence they may be removed while in blossom to the situations they are required to decorate, and after flowering should be returned to the frame and slightly protected during severe weather. They are increased by the offsets from the old corms; and also in some cases by seeds, which may furnish the means of increasing the variety of these autumnal ornaments.—M.

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CONSOLIDATED, *VERSUS* POROUS SOIL.

IN a notice of Mr. Rivers's nursery, at Sawbridgeworth, by Mr. Downing of New York, recently published in the *Horticulturist*, a transatlantic publication, we find the subjoined passage:—"A singular mode of growing Strawberries in pots, for forcing, is practised here with great success, and is the same as that pursued by one of the most celebrated English market gardeners. It consists in growing the plants in pots filled with good soil—say three-fourths loam and one-fourth rotten dung—*pounded down* in the pot quite hard with a mallet. [The pots are placed alongside the beds, and the runners fixed on the soil in them: when rooted they are treated in the usual way]. The increased size, vigour, and productiveness of the plants and fruit grown in these closely crammed pots, are, we are assured, undeniable. This method is opposed to all ordinary theory and practice, which depend upon making and keeping the soil loose and mellow."

In a subsequent page of the same work is an article commenting on the above statement, by Mr. Meehan, an English gardener, formerly employed at Kew, now of Philadelphia, of which we give the substance, as follows, as a text for the comments of some of our correspondents:—

"'Facts, in themselves seemingly trifling, are often of the greatest importance to the physiologist and natural philosopher.' I have found that this is true, and so, doubtless, have many of your readers. The firmly pressed soil in the Strawberry pots, may lead to results as great, in the practice of horticulture, as the falling of an apple to the science of astronomy.

"My first observations on this subject are connected with the unfortunate potato. It was not long after my good father had permanently taken me with him, to teach me the beautiful intricacies of the various branches of his profession, that we were walking together through the farm, where the men were digging potatoes; in the field were growing various kitchen crops almost in daily requisition, and this, with other reasons for crossing it, combined to make the *headland* quite a road-way,—so much so, that perhaps, for a width of four or six feet, the potatoes were trodden under foot, and the ground about them rendered very hard. I pointed out to my father that the potatoes dug from this part were fully one-third larger than the others, and inquired the reason. He gave, as his opinion, that the action of the plough drawing the manure towards the headland, and rendering the soil deeper there, the production of superior potatoes was the consequence. This partly satisfied me; but I never could entirely disconnect the idea of the big lumps of hard solid earth from the large potatoes.

"The year following, another circumstance recalled this observation. In drilling onion seed some was spilled on the alleys between the beds, where the ground was, of course, much trodden; but the accidentally spilled seed produced onions twelve or fourteen inches in circumference, which, in that latitude (Isle of Wight), was above the average. Some time after that, I observed a similar circumstance attending a crop of carrots. To get some explanation of these effects, I studied Lee and Lindley, Main, Rennie, and whatever other writers on vegetable physiology I could lay my hands on; but the conclusions my facts seemed to lead me to were so opposite to every principle seemingly laid down by these writers, that I doubted the accuracy of my judgment, and suffered the subject to sleep in my breast for some time.

"Shortly after I became attached to the Royal Garden at Kew, the question of the 'one-shift' against the old or 'progressive' system of potting plants, was started by Mr. Ayres of Brooklands. While the discussions on these subjects were pending, an intelligent corresponding friend, giving an account of a visit to one of the ablest advocates of the one-shift system, highly eulogised the appearance of the heaths, but suggested that the success in many instances met with, was owing to the greater care taken to render the mechanical condition of the soil more perfect than the followers of the progressive plan usually took. The soil, he stated, was, by this grower, rammed into the pots most intensely, and he was satisfied this was an essential point in the culture of the heath. While at Kew, the practice of our working foreman, in pounding and hammering the soil vehemently around the plants he repotted—so different from the practice we had observed elsewhere—afforded us all amusement; yet, that over, I am sure all will agree with me, that the majority of the plants in Kew gardens, though necessarily wanting room, make as thrifty and handsome shoots as similar plants in any collection.

"I will detail one more fact. While foreman to Mr. Buist, at Rosedale, near Philadelphia, I had occasion to pot between two and three hundred dwarf roses, in mid-winter. The only soil we could use was frozen through; it was thawed by the fire, and, of course, became perfect mud. This was mixed with one-half rotten dung, and the pots quite filled without being subjected to pressure. Afterwards these were placed in a cool pit. They received no water for six weeks. The soil was then rammed down as tightly as it could be made, and afterwards well watered. No Roses ever made a more handsome growth than these did in this firmly pressed and pounded soil.

"My practice has been much modified by these and similar observations, though I have no satisfactory explanation of the reason why; but theory must sometimes hang on the skirts of practice.

"I may remark, ere I conclude, that agriculturists are, for once, ahead of us. They know the preference to be given to firm soil over that which is loose and porous, as appears from Stephens's *Book of the Farm* (Amer. ed.):—'The reason why I have so frequently recommended the subsidence of the land before sowing the seed is, that wheat thrives much better in soil having a little firmness about it, than when in the loose state in which the plough leaves it.'"

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New and Rare Plants.

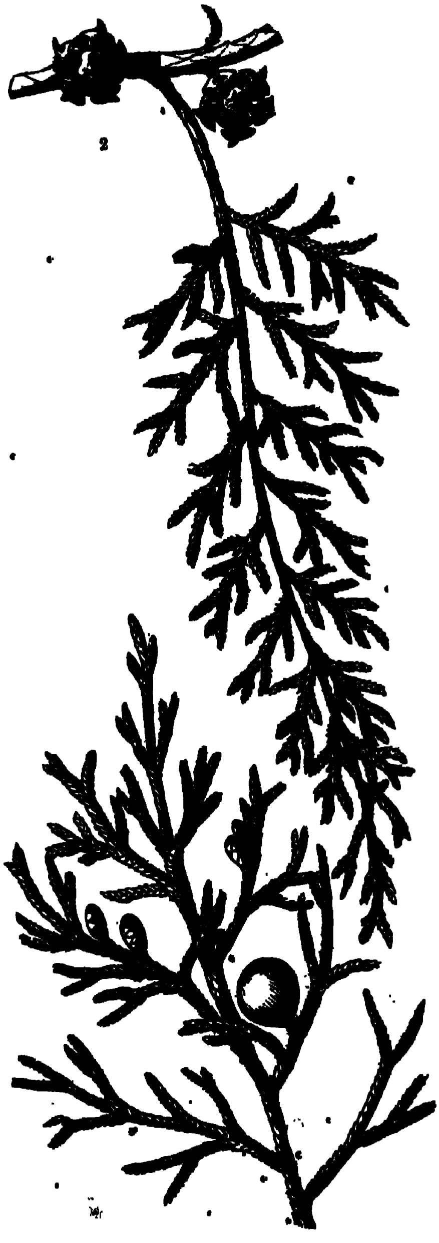
Pachira macrocarpa, *Hooker*. Large-fruited Pachira (*Bot. Mag.*, t. 4549).—Nat. ord., Sterculiaceæ § Bombaceæ.—Syn., Carolinea macrocarpa, *Chamisso* and *Schlechtendahl*; also P. longifolia, and long-flowered P. *Hooker*, *l. c.*, both apparently by error.—A tall and rapid-growing stove-tree, of majestic appearance, furnished with large evergreen glabrous digitate leaves, which have oblong-obovate entire leaflets; and bearing very large magnificent flowers, having linear strap-shaped petals, six inches long, reflexed in the upper half, white and smooth within, greenish-brown, and slightly velvety on the outer surface; the staminal tube is rather short, divided into innumerable parcels, each separating into eight or ten filaments, which are yellow below, deep red above, and nearly as long as the petals: this mass of coloured spreading filaments is very showy. From Mexico. Introduced from the garden of M. Makoy of Liege, before 1850. Royal Botanic Garden, Kew.

Hymenocallis Borskiana, *De Vriese*. Vanilla-scented Hymenocallis (*Paxt. Fl. Gard.* i., 154).—Nat. ord., Amaryllidaceæ § Narcisseæ.—A handsome stove bulb, with dull green leaves, upwards of two feet long, and a compressed scape as long as the leaves, bearing an umbel of about seven large flowers, which are white, with a very thin transparent entire coronet, and smell of vanilla. From La Guayra. Introduced to the Botanic Garden at Leyden in 1846. Flowers? ——

Ilex microcarpa, *Lindley*. Small-fruited Holly (*Paxt. Fl. Gard.*, i. 43).—Nat. Ord., Aquifoliaceæ.—A hardy evergreen shrub, with entire oval-acute leaves, perfectly smooth, and bearing stalked umbels of very small berries. From the north of China. Introduced by Mr. Fortune in 1849. Messrs. Standish and Noble, of Bagshot.

Quercus inversa, *Lindley*. Obovate-fruited Oak (*Paxt. Fl. Gard.*, i. p. 58).—Nat. Ord., Corylaceæ.—An evergreen tree, apparently with the habit of the common evergreen Oak. The branches are tomentose; the leaves stalked, obovate, obtuse, cuspidate, leathery in texture, deep green and shining on the upper surface, covered beneath with short glaucous down; the acorns grow in crowded spikes, and are obovate, seated in shallow tomentose cups; the male flowers form long downy tails from the ends of the branches; the females are sessile, arranged with tolerable regularity in threes. From the north of China. Introduced by Mr. Fortune in 1850. Messrs. Standish and Noble, of Bagshot.

Cupressus funebris, *Endlicher*. Funebral, or Weeping Cypress (*Paxt. Fl. Gard.*, i. 47).—Nat. Ord., Pinaceæ § Cupresseæ.—Syn., C. pendula, *Staunton*.—A large evergreen coniferous tree, perfectly hardy, and extremely elegant in its growth. Mr. Fortune describes it as having a perfectly straight stem, sixty feet in height, with branches growing at first horizontally, then taking a graceful curve upwards, the points drooping like a weeping-willow: these weeping branches are long and slender, giving to the entire tree an extremely graceful weeping form. The branchlets are two-edged, much branched, fern-like in appearance, covered with bright green adpressed leaves, closely imbricated in four rows. This tree will be particularly valuable "for park scenery, lawns, the entrance to suburban villas; and an appropriate ornament to the resting-places of the dead." From Chinese Tartary. Introduced in 1849 by Mr. Fortune. Messrs. Standish and Noble, of Bagshot.



1. *Cupressus funebris.* 2. *Juniperus sphærica.*

Juniperus sphærica, *Lindley*. Globe-fruited Juniper (*Paxt. Fl. Gard.*, i. p. 58).—Nat. Ord., Pinaceæ § Cupresseæ.—An evergreen tree, said to grow from thirty to fifty feet in height. The branches are clothed with scale-like obtuse leaves, arranged in four rows, and having a circular pit at the back; the young branches are usually very slender, and four-cornered from the regular disposition of the leaves. The fruit is quite spherical, glaucous, shortly pedunculate, and about half as large as the ball of a pocket pistol. From the north of China. Introduced by Mr. Fortune in 1850. Messrs. Standish and Noble, of Bagshot.

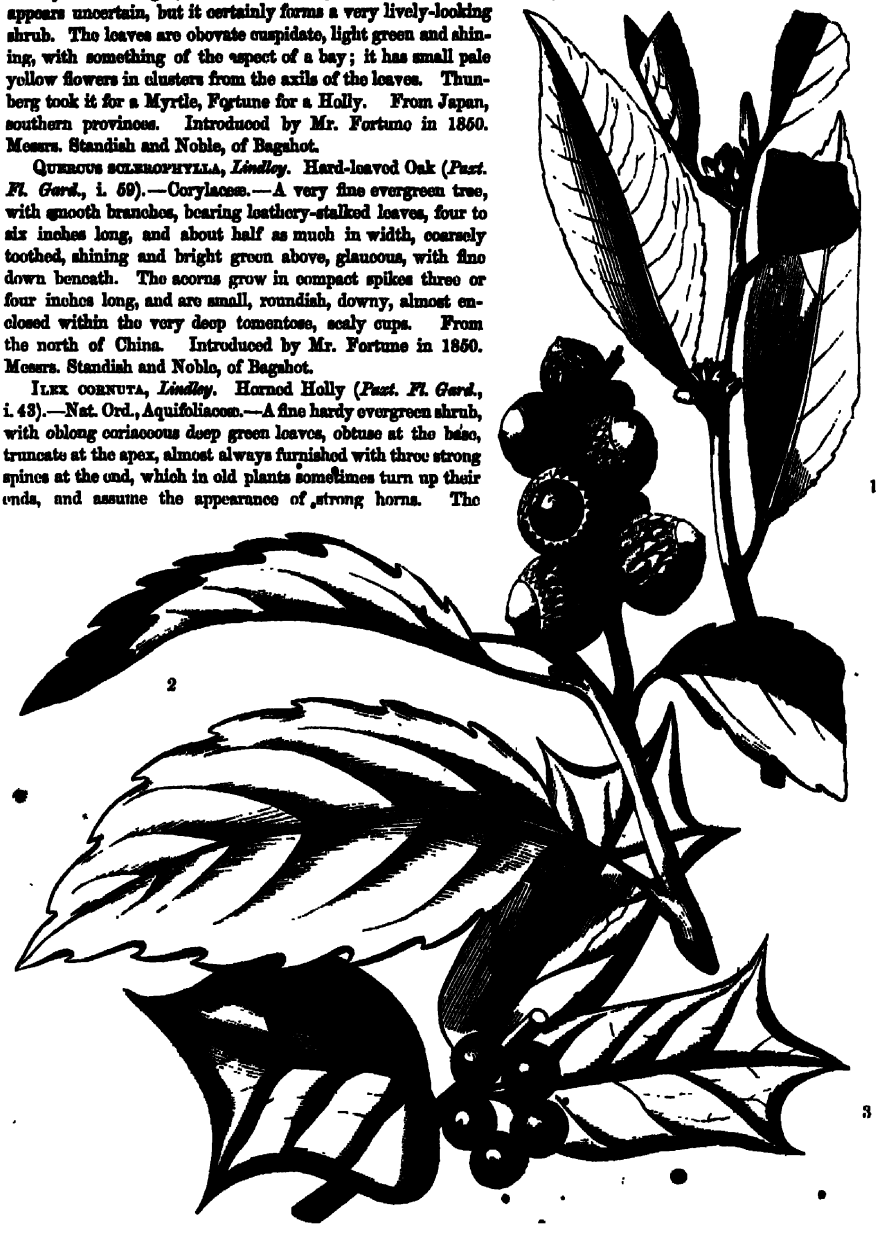
Abies jezoensis, *Siebold*. Jezo Spruce Fir (*Paxt. Fl. Gard.*, i. 42).—Nat. Ord., Pinaceæ § Abieteæ.—A large evergreen, probably hardy tree, having the young branches covered with rusty down, the older ones smooth. The leaves grow in two rows, and are brilliant green, about an inch and a quarter long, and a line and a half wide, terminated, when mature, by a spine. The cones are pendulous, narrow tapering, about six inches long, the scales loose, broad, rounded, and convex, having at their base, a short roundish slightly serrated bract. From Japan. Introduced in 1849. Messrs. Standish and Noble, of Bagshot.

Rhipsalis pachyptera, *Pfeiffer*. Thick-winged Rhipsalis (*Paxt. Fl. Gard.* i. 155).—Nat. Ord., Cactaceæ § Rhipsalidæ. — Syn., Cereus alatus, *Link* and *Otto*. A small trailing succulent stove shrub, with leafy joints, roundish ovate compressed, nearly flat, hanging down, deeply crenated. The flowers are small, pale brownish yellow, sessile, and solitary from each crenature; they are succeeded by small berries, about the size and colour of a red currant. From Brazil: Rio de Janeiro. Introduced in 1839. Flowers in April. Sir C. Lemon, Bart.

Symplocos japonica, *De Candolle*. Japan Symplocos (*Past. Fl. Gard.*, i. p. 61).—Nat. Ord., Styracaceæ § Symploceæ.—Syn., S. lucida, *Zuccarini; Furiggi* of the Chinese.—An evergreen shrub, or bush growing, naturally twenty feet in height, and much used by the Japanese for decorating the shrines of their idols. Its hardiness appears uncertain, but it certainly forms a very lively-looking shrub. The leaves are obovate cuspidate, light green and shining, with something of the aspect of a bay; it has small pale yellow flowers in clusters from the axils of the leaves. Thunberg took it for a Myrtle, Fortune for a Holly. From Japan, southern provinces. Introduced by Mr. Fortune in 1850. Messrs. Standish and Noble, of Bagshot.

Quercus sclerophylla, *Lindley*. Hard-leaved Oak (*Past. Fl. Gard.*, i. 59).—Corylaceæ.—A very fine evergreen tree, with smooth branches, bearing leathery-stalked leaves, four to six inches long, and about half as much in width, coarsely toothed, shining and bright green above, glaucous, with fine down beneath. The acorns grow in compact spikes three or four inches long, and are small, roundish, downy, almost enclosed within the very deep tomentose, scaly cups. From the north of China. Introduced by Mr. Fortune in 1850. Messrs. Standish and Noble, of Bagshot.

Ilex cornuta, *Lindley*. Horned Holly (*Past. Fl. Gard.*, i. 43).—Nat. Ord., Aquifoliaceæ.—A fine hardy evergreen shrub, with oblong coriaceous deep green leaves, obtuse at the base, truncate at the apex, almost always furnished with three strong spines at the end, which in old plants sometimes turn up their ends, and assume the appearance of strong horns. The berries are large, in sessile axillary umbels. From the north of China. Introduced by Mr. Fortune in 1849. Flowers in spring. Messrs. Standish and Noble, of Bagshot.



1. *Symplocos japonica.* 2. *Quercus sclerophylla.* 3. *Ilex cornuta.*

THE HORTICULTURAL SOCIETY'S GARDEN, CHISWICK.

THE spirit of improvement appears at last to have made an entrance into the garden of this society, and within the last few months considerable alterations have been made, not only in the grounds and houses, but also in the keeping of the same. For some years past, from the July show to the following April, it has been customary to leave the grass in the Arboretum in an uncut state, and at this season it was not an unusual thing to find one's-self ankle-deep in "old fog," as the farmers call it, the sight of which would have made a London cow's mouth water. In fact, as the shows supplied the means of keeping the gardens, they apparently were the only things cared for; and consequently, the whole staff of officers and workmen, after they were over, seemed to fall into a state of hybernation, from which they were only aroused by the returning warmth of spring. Now however, on our last visit, though the garden was enveloped in thick London fog, all was activity; the grass was close shaven, the leaves swept up, the walks clean; and even the walks of the orchard, the last place generally thought of, looked fresh and smooth, from the recent operations of the garden roller. This is as it should be, and if the present activity continues, the garden, in point of keeping, will take rank with those of private gentlemen in the neighbourhood.

The hint we gave (I, 147) relative to the primeval state of the Arboretum, has been acted upon; a number of the duplicate specimens and useless trees have been removed, and the sooner some scores more follow them to the rubbish and faggot-heap the better. We want—and the trees too—poor things, more breathing room; we want to get rid of the digged ground around large trees; and we want, and must have, the specimens of shrubs to recline on the velvet turf rather than, as they do now, kiss the naked clod. We therefore, in the spirit of cultivating selections rather than collections of plants, say—away with them; thin out the encumberers of the earth, and give room for those retained to form themselves into single specimens or picturesque groups. Let the whole of the beds, where the plants are established, be grassed over, and leave no naked ground, except such as is occupied by herbaceous borders or for decorative plants in the summer season.—We willingly acquit the present managers of the Society of the faults of the first design for the garden; but we have personally been acquainted with it sufficiently long to know, that had the present activity prevailed, much of the impropriety of the original plan might have been amended, instead of being at the present time in such a state, as to admit of a recent author making the following truthful remarks relative to it: "Instead of being a place to which we should have much pleasure in directing attention as an example of good taste, or as an exponent of the principles of modern improvement, we are in truth compelled to condemn it for its deficiencies, or to point it out as an example to be avoided, on account of the intricacy that is too plainly perceptible in all parts of the grounds." * The alterations which were made in the Arboretum in the early part of the present year, were judicious, and we think have given pretty general satisfaction; but we cannot reconcile ourselves to the huge, ugly walks, which are, and in the present form ever will be, an eyesore to persons of taste. Dry walks may be formed without "piling" the gravel so high as to require wooden bridges to get over it, as is positively the case, ridiculous as it may seem, on the morning of the exhibitions; and that, too, without any more outlay than has been incurred in the formation of the present ugly and obtrusive things. In truth, in avoiding Scylla, the projectors have foundered upon Charybdis; in getting out of a ditch, they could not rest satisfied upon the level plain, but must e'en ascend to the mountain to keep their feet dry. Another point in the Arboretum must also be attended to; when the necessary number of trees and evergreen bushes have been removed: the whole of the grass must be taken up and the ground be levelled. When we say levelled, we do not mean that the whole area must be plane surface, but that the undulations shall be smooth and even, and not, as is the case at the present time, a continuity of hills and holes, in some parts almost dangerous to walk over. Although this improvement may be delayed for a time, until more urgent alterations are completed, it is the polishing stroke, and must be attended to. The expense, as it would be confined to labour, would to the Society be mere bagatelle, especially at the low rate at which the men are paid. Smoothness is a fundamental principle of beauty, and, as has been remarked by Burke, no object can be beautiful which is not smooth; and, therefore, the smoothness of the Chiswick lawn we may count among the good things coming.

Leaving the Arboretum, we proceed by the experimental gardens, as they are called, where the plants, more especially the Orchids, are in excellent order, to a kind of private garden, where a commodious propagating-house has recently been erected. This is span-roofed, with a path through the centre, and tank-heated borders, for bottom heat, on each side. It is divided into two parts, one being used for propagating, and the other part at the present time is occupied with some specimen stove plants, or

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* Beauties of Middlesex, p. 172.

young stock which it is intended to convert into specimens. The west side of this house is glazed with Hartley's patent rough plate glass, and the east with common, which, after recommending the rough plate so strongly, looks something like showing the white feather at head-quarters. Possibly, however, they have acted wisely; at least, we think so. Several of the old Pine pits have also been altered; that is, paths have been put through them, so as to render them more suitable for successful plant management. In one we noticed a recent importation from Dr. Sieboldt, and tolerable specimens of some of the best of Fortune's and Hartweg's introductions; in another pit, a batch of seedling Cinerarias were progressing favourably, and indeed the whole of the pits and houses have the appearance of preparation for a formidable campaign in 1851.

From the frame-ground a new entrance has been made to the pleasure-grounds; and, westward of the kitchen-garden, in a corner which has been in a neglected state for some years, a new rock-garden is being formed. The even surface of the ground has been broken by deep excavations, and the sides of the mounds thus formed are faced with rock-work. The design, generally, is good, but already some glaring errors, in the execution, have been committed. For instance, to connect the kitchen-garden with the back yard a bridge for carriages has been formed, and underneath it the walk passes to the rock-garden; but this bridge, instead of having a rustic foundation is plain brick, and the battlements are formed of squared timber, tarred over, though there is plenty of suitable material to have formed a rustic bridge, lying close by. This rock-garden, as offering a suitable situation for growing Alpine plants, ferns, &c., will be a useful appendage; and report says, that here also an exhibition of American plants, in imitation of the Royal Botanic Society, is to be held next season. When the garden is finished, which it will not be for some time to come, we shall recur to it, and if worthy give an illustration or two of its leading characteristics. Around the boundary-walk considerable alterations are being made: a number of the trees have been cut down, and the line of walk is also to undergo some alteration.

The ruthless hand of the destroyer has also been at work in the orchard; nearly one-half of the trees have been levelled to the ground; and the ground has been trenched three feet deep, and planted with young trees, which we believe are to be trained as espaliers: that form being considered the most suitable for proving the quality of the various kinds. The trees which have been planted one season are doing well, and in a few years will form an important and interesting feature. In another division, a number of trees have been planted, upon which the various systems of training and pruning fruit-trees, practised by our Continental neighbours, are to be exemplified; and in a third place, all the new fruits introduced up to the present time are planted, for the purpose of proof. The orchard has also been intersected by grass-walks, so that in the season it will form an agreeable and interesting promenade. Whether the kitchen-garden is to undergo any improvement we do not know; but it is imperative on the Society to make an attempt to rectify the confusion at the present time existing in our vegetable nomenclature. This would be a good service; and though it might occupy a few years to accomplish the reform, it is a subject worthy the attention of the Society, and one which the public has a right to expect at its hands.

We must not leave the garden without stating that Ker's, or as they are sometimes called, "River's Peach Frames," have, like Hoare's Vine columns, been found useless and expensive toys. The fruit upon the trees were ten days later in ripening than upon the open walls; and even then, only the sunny side was eatable, the under side being quite hard.

We understand that some alterations are to be made in the distribution of plants and seeds to members; and we should hope that the plan of distributing sixpenny plants, and penny packets of seeds, will be discontinued, not only as being injurious to the trade, and derogatory to a scientific institution, but also as absorbing means which might be much more advantageously expended. The only plants which the Society has any right to distribute, are new plants, or seeds of its own introduction; but the plan of buying common seeds from the London seedsmen, to distribute in almost infinitesimal quantities among its own members, is a mere waste of property; for, to our own knowledge, the seeds, instead of being sown, are, when they get into the hands of the gardeners, carefully deposited at the back of the fire.

In the Conservatory, the Chrysanthemums were blooming; but here, as at most other places, the flowers were by no means good, and were very disproportionate to the size of the plants. In conclusion, we may remark that nothing will give us more pleasure than to record the improvements in the Garden of the Horticultural Society; and the Fellows cannot be too grateful to Dr. Daniels, and one or two other members of the Council and Garden Committee, for the improvements they have already been the means of effecting. Go on, and prosper, say we.—A.

Miscellaneous Notices.

The Ivy.—The Ivy is not only ornamental upon trees, but it is also remarkably well adapted to ornament cottages, and even large mansions, when allowed to grow upon the walls, to which it will attach itself so firmly by the little rootlets sent out by the branches, that it is almost impossible to tear it off. On wooden buildings it may perhaps be injurious, by causing them to decay, but on stone buildings it fastens itself firmly, and holds both stone and mortar together like a coat of cement. The thick garniture of foliage with which it covers the surface, excludes stormy weather, and has, therefore, a tendency to preserve the walls, rather than accelerate their decay. The Ivy is the inseparable accompaniment of the old feudal castles and crumbling towers of Europe, and borrows a great additional interest from the romance and historical recollections connected with such spots. Indeed, half the interest, picturesque as well as poetical, of those time-worn buildings, is conferred by this plant, which seeks to bind together and adorn with something of their former richness, the crumbling fragments that are fast tottering to decay:—

"The Ivy, that staunchest and firmest friend,
That hastens its succouring arm to lend
To the ruined fane, where in youth it sprung,
And its pliant tendrils in sport were flung.
When the sinking buttress and mouldering tower
Seem only the spectres of former power,
Then the Ivy clusters around the wall,
And for tapestry hangs on the moss-grown hall,
Striving in beauty and youth to dress
The desolate place in its loneliness."

The Ivy lives to a great age, if we may judge from the specimens that overrun some of the oldest edifices of Europe, which are said to have been covered with it for centuries, and where the main stems are seen nearly as large as the trunk of a middle-sized tree.

"Whole ages have fled, and their works decayed,
And nations have scattered been;
But the stout old Ivy shall never fade
From its hale and hearty green.
The brave old plant, in its lonely days,
Shall fatten upon the past;
For the stateliest building man can raise
Is the Ivy's food at last."

Downing's Landscape Gardening.

Charcoal is an impure form of Carbon, and is manufactured on a large scale for the purposes of the arts. The process of manufacture consists in exposing to heat billets of wood, or other organic matter, under such conditions as either wholly or partially to exclude air. Charcoal has several properties which render it of value to the cultivator. As a manure, it does not act by furnishing carbon to the vegetation; because it is, in reality, one of the most indestructible substances known, and remains for an indefinite length of time without change. But it is remarkably absorptive of certain gases which it retains within its pores in a state of high condensation. A fragment of freshly burned charcoal condenses as much as ninety times its bulk of ammoniacal gas, and thirty-five times its volume of carbonic acid. As these two gases form the principal organic food of plants, it is obvious that charcoal may have a powerful individual action upon their growth. The experiments of Saussure, and others have shown that plants flourish with great luxuriance when the atmosphere in which they grow contains more than the usual amount of carbonic acid. Charcoal, after having absorbed carbonic acid and ammonia from the air, places plants under favourable conditions for receiving and appropriating a larger than usual amount of this organic food. The only difference is, that instead of entering the plant by the leaves, they reach it through the roots, which absorb the rain water containing these gases, washed out from the charcoal. Thus, charcoal, from its absorptive nature, becomes an indirect means of increasing the supply of carbon and nitrogen to plants. Different kinds of charcoal have varying values in this respect. Experiments made by exposing freshly burned pieces of charcoal to the air, showed their different absorptive powers, by the increase in weight after they had been exposed a week to the atmosphere. The charcoal from fir gained 13 per cent. in weight; that from lignum vitæ, 9·6; that from box, 14; from beech, 16·3; from oak, 16·5; and from mahogany, 18. Charcoal also possesses the property of absorbing and retaining the odoriferous and colouring principles of most organic substances. It is, on this account, used for removing the putrefactive taint from foul water, or other putrid substances. When used as a filter for foul water, both the smell and colour are removed. From this deodorising property charcoal is frequently mixed with night-soil and other decaying manures, which it keeps free from smell, and, at the same time aids in preserving, by absorbing the gases which would otherwise escape. A mixture of charcoal and burnt clay is frequently used for this purpose, with excellent effect. Charcoal, when employed as a manure, acts, to a small extent, by presenting, in a soluble form, the ashes of the wood from which it was prepared; but this action is only temporary and of small importance, when compared with its principal point of utility, viz., its power of absorbing from the air the gaseous food of plants; and therefore, of presenting it in a more condensed form, and in greater quantity.—*Prof. Playfair, in Morton's Cyclopædia of Agriculture.*

POMPONE CHRYSANTHEMUMS—PYRETHRUM INDICUM; VARS.

Nat. Order.—COMPOSITÆ § CORYMBIFERÆ.

GENERIC CHARACTER.—Pyrethrum, *Gærtner.*—*Capitules* many-flowered, heterogamous; florets of the ray in one series, ligulate, pistillate, very rarely wanting; florets of the disk tubular perfect. *Involucre* bell-shaped with the scales imbricated, their margins scarious. *Receptacle* convex, naked, or flat, and sometimes with small paleæ. *Corollas* of the *ray* ligulate, of the *disk* tubular, tube often compressed, two-winged, more rarely round, limb five-toothed. *Anthers* without appendages. *Stigmas* of the *disk* without appendages. *Achænia* alike, not winged, irregular. *Pappus* crownlike, very often toothed, sometimes auriculiform, of the diameter of the achænia.—Herbs, mostly perennial, rarely shrubby, sometimes annual, scattered over the temperate regions of the old world, more abundant in Europe; leaves alternate, dentate, or variously lobed; capitules solitary or corymbose; disk yellow, or very rarely white; ray white or very often yellow.—(*Endlicher Gen. Plant.* 2670).

Sect. e. *Dendranthema.* De Candolle.—*Involucre* scarious, capitules very readily becoming partly or altogether double by increase of the ligulate florets; scarious bracteoles thin, scattered among the ligules upon the receptacle.

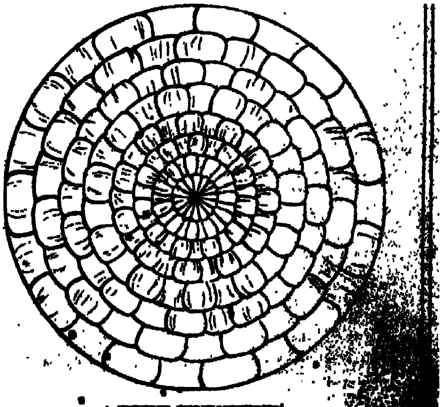
PYRETHRUM INDICUM, *Cassini.*—Indian Chrysanthemum. Stem shrubby, branched; branches pubescent at the summits; leaves stalked, ovate, incised, pinnatifid, closely toothed, flaccid, quite entire at the summit; involucre of very obtuse scales with the margins broadly scarious; ligules little shorter than the involucre.—*De Candolle Prodromus.*

FLORISTS' VARIETIES:—

1. Pompon d'Or.
2. La Fiancée.
3. Daphnis.
4. Circé.

DESCRIPTION.—Shrubby perennials, with dull green erect pubescent stems. Leaves stalked alternate, or imperfectly opposite by approximation, the general outline broadly ovate, deeply cut into five lobes, the sinuses somewhat rounded on the angle, the lobes rather spathulate, the terminal longest: the two inferior smallest and half-joined to the two intermediate lobes, all crenate with slightly apiculate teeth; the blade of the leaf prolonged from a wedge-shaped base into a gradually decreasing wing to the petiole; the axils mostly bearing a short branchlet with a tuft of small leaves. Leaves all dull green above minutely corrugated and again punctate, dull pulverulently mealy below from the presence of a minute stellate pubescence lying flat upon the surface. Inflorescence axillary and chiefly collected into a terminal corymb by the crowding of the floral leaves. Peduncles bracteolate about the middle, with one or two small trifid wedge-shaped or simple lanceolate leaves. Involucre somewhat hemispherical, of about three rows of obtuse, somewhat wedge-shaped scales, with brown scarious margins, a solitary one frequently a little below the involucre. Receptacle conical without paleæ, punctulate, with raised papillæ for the florets, or with a few membranous bracts among the ligules of double florets. Ray ligulate; the ligulate florets with a long tube and short broad entire bifid or trifid ligule, often concave, female, the style elongated. Disk with tubular perfect florets, the tube longish somewhat campanulate, with about five acute and erect teeth (very readily becoming ligulate, *flore pleno*). Stamens syngenesious without appendages; styles elongated, stigmas like those of the female flowers.

The species P. indicum of Cassini is said by De Candolle to differ from P. sinense only in the very much smaller size of the capitules, and on those grounds we refer the present plants to this; but the distinction is anything but satisfactory; indeed the description of P. sinense in the Prodromus would agree better with our plants in regard to the leaves, which are more properly "sinuately pinnatifid, toothed, coriaceous and glaucescent," and we should have referred it to this supposed species had it not been for the remark contained in the same work, that P. sinense and P. indicum "only differ in the former having the capitules twice or more than twice as large." The present race of varieties strike us as being produced by some artificial process of dwarfing, such as is common with the Chinese, and the result has been the great reduction of all the vegetative organs—the stem, leaves, and corollas; while the reproductive organs—the stamens, pistil, and achænia, are more developed than in the ordinary double garden Chrysanthemums.—A. H.



A PERFECT CHRYSANTHEMUM.

The varieties figured in the accompanying plate belong to a group of the Chrysanthemums, which have originated from a variety called the Chusan Daisy, introduced by Mr. Fortune from the Celestial Empire in 1846. They are distinguished generally by their dwarf compact habit, small foliage, and small daisy-like flowers; though these characteristics, that of the size of the flowers especially, seem to be less exactly perpetuated in the succeeding generations which florists have called into existence. They are dwarf sub-shrubby plants, growing from a foot and a half to two and a half feet high, and bearing a profusion of blossoms which in Pompone d'Or are of a brilliant golden yellow, the flowers measuring about an inch and a half in diameter, and composed of several rows of ligulate or strap-shaped flat florets, encircling a few tubular florets in the centre; the flower is double, but rather flat on the face. La Fiancée is a beautiful little pure white variety; the flowers an inch and a quarter in diameter, quite double, the florets all strap-shaped, and rather deeply notched at the tips; the flowers resemble a full double large-flowered daisy. Daphnis is larger, measuring an inch and three quarters in diameter, but of the same dwarf habit; the colour a deep reddish purple, the flowers rather flat, and having a few tubular florets in the centre. Circé is a flower of different character, measuring about an inch and a half across, the petals all strap-shaped, numerous, and reflexed, the centre being very full and rounded; the colour is a rosy pink, becoming paler towards the centre, which is white. These varieties are all of continental origin, and have been recently introduced.

CULTURE.—The culture of the Pompone Chrysanthemums agrees with that of the larger varieties, the treatment of which is detailed in the subjoined communication from Mr. Smyth, gardener to the Rev. T. Rooper, of Wick Hill, Brighton:—

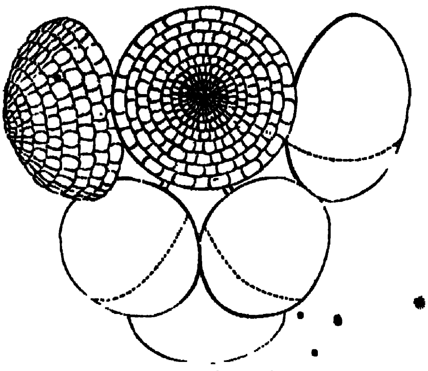
> "In March I take strong cuttings of each variety, and prepare for them 32-sized pots, half filled with broken charcoal, and made up with a compost, of equal parts light loam and leaf mould, mixed with sand; about eight cuttings are inserted into each pot. They are placed in a gentle heat, slightly sprinkled every morning, and kept shaded from the sun. As soon as they are well rooted, I pot them into 60-sized pots, and place them in a warm atmosphere for a few days, until they have filled the pots with roots. They are then removed to a cold frame, and are sprinkled every morning with a fine rose water-pot, air being given during the day. I stop them at the third eye, and allow them to remain in the frame until May, when they are shifted into 32-sized pots, prepared with about an inch of broken charcoal over the crock at the bottom. The compost I use for this potting consists of two parts light loam, to one part of well decomposed dung, sand being freely mixed with the whole. When potted and watered they are plunged two feet apart in beds having coal ashes at the bottom of the trench, to prevent worms entering the pots. I keep the plants stopped at every third eye until the middle of August. Care must be taken not to let the plants suffer for want of water, for nothing can be more injurious to them. I use manure-water three or four times a-week, and sprinkle the plants over head night and morning. Early in September the finest plants are selected and repotted into 12-sized pots, which are well drained, as before directed, and the same kind of compost is used. These are placed under a south wall, and kept well supplied with water. The smaller plants are repotted into 24-sized pots, and placed under an east wall. By the middle of October the early-flowering plants are moved to the greenhouse, or into pits, air being given freely in the day time. Those intended for late flowering are left under the east wall as long as the weather will permit. About the second week in November, I remove all that are in flower to the conservatory, where a good supply of blossom is kept up for two months by these beautiful plants. Under this treatment, I have had, in the present year, plants that measured only eighteen inches in height, and two feet in diameter, with fine foliage from top to bottom, and profusely laden with blossoms."

From our own experience we should conclude that this class of Chrysanthemums will not bear stopping so well as the other kinds. It appears also, that they should be started into growth rather early, and be kept growing steadily throughout the summer. In many instances, during the past season, we have noticed that plants checked by becoming pot-bound, or by neglect of watering, have not developed their blossoms, though buds have formed. We should, therefore, propagate early, shift progressively, and secure dwarfness by exposure to light and air, rather than by any system of stopping.—M.

PROPERTIES OF THE CHRYSANTHEMUM.

By Mr. G. Glenny, F.H.S.

It is a curious circumstance in the character of the Chrysanthemum, that however nearly some of the flowers may approach the general form required, there is scarcely two of the same construction. One globular face is formed of long petals reflexing, another by a succession of cupped petals, one row above another to the centre; a third may be formed by a mass of incurved petals, whose spoon-like ends showing the backs only, curl over and form an almost solid surface by their closeness; others again have petals broad and flat, but towering one above another, forming a fine symmetrical flower to the centre; and we have only spoken now of the varieties fit to show because of their approach to the desirable form of half a ball. But for those who grow a general collection for the sake of variety in form and colour, there are many more forms—some throwing out their quill-like petals like so many diverging rays, and scarcely opening even the ends of these quills at all; others again have quilled petals, but open at the ends a tolerably broad surface of the inner side; then some have long ragged tassel-like flowers in the form of a loose mop—but the most fanciful of these varied forms, and perhaps the prettiest of all, is that of a round disk formed with broad flat petals, and a globular mass of quilly florets nearly filling it. It is this variety of construction running through the whole family that perplexes the judges at a show; but they should look to the main point first: no matter what the construction, whichever flower makes up the best and closest half of a globe is the best flower, while those which are open and loose are the worst.



A PERFECT POMPONE CHRYSANTHEMUM.

THE POMPONE VARIETIES.

The properties of the Pompone varieties do not vary much from those of the larger family; but as their diminutive size is their chief distinction, it is the more necessary that they should be compact and symmetrical. They must not show a disk. If the centre be not covered well, they must be discarded as soon as their colour can be got with a sound close centre. They should be as perfect as the ranunculus or double Crow-foot, and as double as a double Primrose of the better kind. The flowers should be abundant at the end of all the shoots in bunches, with footstalks sufficiently long to prevent the blooms covering each other. They should not be larger than one and a half inch diameter, nor smaller than an inch, and the habit of the plant should be short-jointed and shrubby. At an exhibition they must be shown on the plants. These should not be more than eighteen inches high, nor less than twelve inches, with one or more flowers perfectly open at the end of every shoot. The style of flower in all the family of Chrysanthemums should rank thus:—Flowers forming a half ball, ranunculus fashion; flowers forming a half ball by incurving; flowers forming a half ball by reflexing; anemone flowers; tasseled flowers; quilled flowers; flowers showing a disk. Of these the first three alone are showable in an open class; the anemone flowers form a class by themselves; the tasseled and quilled sorts are not showable except on the plant in collection.

PROPERTIES OF THE CHRYSANTHEMUM.

1. The plant should be dwarf, shrubby, well covered with green foliage to thebottom, the leaves broad and bright, the flowers well displayed at the end of each branch, produced in abundant quantity, and well supported by the stems.

2. The flower should be round, double, high in the crown, perfect in the centre, without disk or confusion, and of the form of half a ball.

3. The individual petals should be thick, smooth, broad, circular at the ends, according with the circle of the flower, the indentations, where they meet, hardly perceptible.

4. The petals must not show their undersides by quilling, and should be of such firm texture as will retain them all in their places.

5. Size of bloom to be large in proportion to the foliage, but the size only to be considered when plants are in all other respects equal.

NURSERY CALLS.

MR. SALTER'S, HAMMERSMITH.

CHRYSANTHEMUMS generally in the vicinity of the metropolis have not bloomed kindly, and therefore it would be unjust to speak positively as to their merits. The Pompones have formed no exception to the rule, and, being new, we have no doubt it will create a prejudice against them. That some of them are worthless, and those among the last imported ones, no one can for a moment doubt; and pretty as they look in M. Mielles's coloured *plate*, by which they were sold, it is quite certain that two-thirds of the collection must be consigned to the rubbish heap. So daisy-like are some of them, that, when taken from the plants, it is difficult to distinguish them from what Burns so poetically termed that flower: and we fear that florists, though they may enter into the spirit of the quotation, will stop short of the last two words, and not consider the Chrysanthemums as the poet did the daisies, "bonny gems:"—

> "Wee modest, crimson-tipped flow'r,
> Thou's met me in an evil hour:
> For I maun crush amang the stoure
> Thy slender stem;
> To spare thee now is past my pow'r,
> Thou bonnie gem."

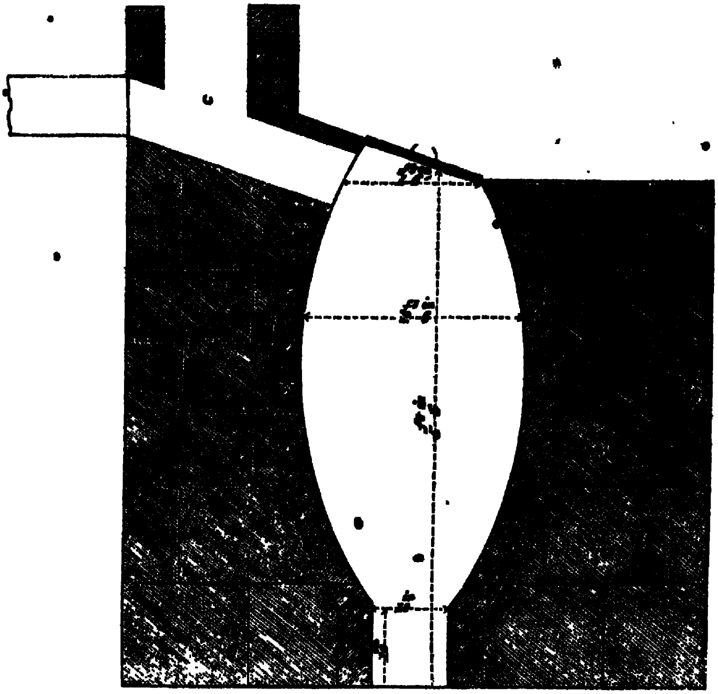
Still we have hope; those figured in a preceding page are not so bad;—like fancy Pelargoniums the Pompones are in their infancy, but, with their elegant habits and profuse manner of producing flowers, they must, under the hands of the careful cross breeder, become fine things. We must recollect that the large kinds a few years back were very shapeless, but they are now fast approaching the standard of excellence; therefore we say to those so favourably situated as to ripen the seed, persevere, and your labours we doubt not will be rewarded.

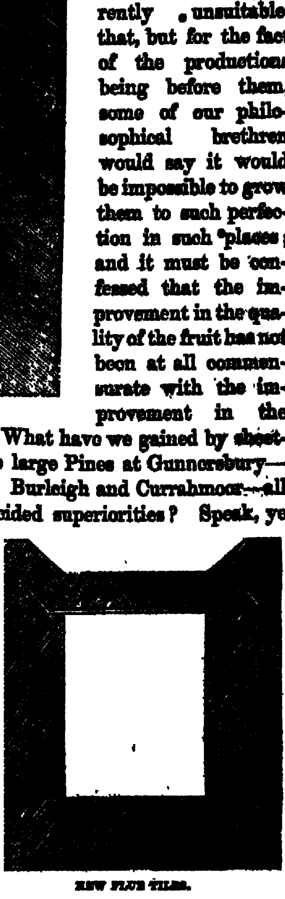
Among the more marketable kinds which we saw the other day at Mr. Salter's nursery, may be mentioned the following Pompones, though it is but just to remark that the flowers, when we saw them, were past their best:—Pompon d'Or is a very beautiful yellow, and very double; Bijou has pink flowers, very double and very pretty; Daphnis (vol. 1, p. 310) is of a deep violet-purple colour, and the flowers are numerously produced; La Superieure has brown flowers, with yellow disk, distinct; La Fiancée is a beautiful white; Elize Mielles deep crimson, very compact; Circe, peach blossom, changing to white; Poulideto, deep pink with white centre; La Lapuonne, cupped pink with anemon ecentre; and La Liliputienne, is very pretty. These kinds, under proper management, will give satisfaction to most growers. Of the larger kinds the best are California, a fine full-petalled yellow raised by Mr. Salter; it is equal to Annie Salter and much deeper in colour. No. 367, a seedling not named, is a delicate pink flower of some promise. Pio Nono, another seedling of Mr. Salter's, has incurved bronzy petals with golden tips, which makes them very remarkable; Louis Napoleon has dark red flowers changing to orange; Christina produces deep peach-coloured flowers of immense size, some of them being upwards of four inches in diameter; Jenny Lind opens yellow, changes to rose, and dies off white—a superior variety; Warden opens yellow and changes to buff; Medusa opens crimson, changes to pink, and dies off rosy white; Cloth of Gold is a quilled incurved flower of fine colour, and Madame de Goderia is a fine white, and a decided beat upon Fleur de Marie; Sydenham has red flowers changing to orange, and Rabelais bronzy rose flowers; Vortigeur has deep red purple flowers, Rebecca pinkish peach colour, and Brilliant bronzy yellow flowers. Of Anemone flowered kinds, Gluck is the best, and a fine yellow; Fleur de Marie is also distinct. The following are also established sorts—Pilot, Temple of Solomon, and Phidias.

Mr. Salter has several more promising seedlings, but this season they had not bloomed sufficiently well to warrant him in sending them out, and consequently they will be grown another season.—A.

THE HEATING OF HORTICULTURAL BUILDINGS.

SINCE the advocates of Polmaise abandoned their cause, this subject has been comparatively in abeyance, and at the present day it is a difficult matter to introduce anything in connection with it that has a novel, and at the same time takes a practical character. The fact, however, appears fast to be gaining ground, that as regards economy, and the complete abstraction of heat from the fuel, the common flue, when properly constructed, is the most effective instrument; and we think that if the same amount of philosophy and hard cash had been expended in improving the common flue as was wasted in Polmaise experiments, a much more profitable and creditable end would have been attained. Every-day experience proves to us that much of the best fruit, and many of the forced flowers and vegetables in Covent Garden and other markets, are produced by the common flue, and that likewise in structures so rude and apparently unsuitable, that, but for the fact of the productions being before them, some of our philosophical brethren would say it would be impossible to grow them to such perfection in such places; and it must be confessed that the improvement in the quality of the fruit has not been at all commensurate with the improvement in the construction and character of the erections in which it is produced. What have we gained by sheet-glass, and its supposed and theoretically-established superiority? The large Pines at Gunnersbury—the magnificent Grapes at Bishops' Stortford—the immense Peaches of Burleigh and Currahmoor—all originated beneath common glass. Has hot water achieved any decided superiorities? Speak, ye market-gardeners, whose early Grapes are celebrated for splendid colour, thinness of skin, and exquisite flavour; and possibly we shall find that neither construction, nor glass, nor hot water, nor superior acquirements, have attained any superior advantages, but that common plodding and ignorant men, in unfavourable situations with ordinary means, have produced, and continue to produce, fruit as good and flowers as sweet as those who have houses upon which expenditure was never more lavish, or situations better calculated to produce perfection; and it is doubtful whether Mr. Paxton's Crystal Palace itself would produce finer plants than are daily seen in places of very minor and inferior pretensions. Thus do extremes meet; and thus do we see that persons of limited means, with a small outlay, backed by good broad common sense, may have fruit and flowers as fine as the man who spends thousands in the formation of a garden, and hundreds annually in the maintenance of the same.


THE FORCING KILN.


NEW FLUE TILES.

In Germany, and also in other parts of the Continent, the common flues are used in preference to hot-water pipes; indeed, with their intensely severe weather, unless an immense surface of pipe is used, it is found impossible to exclude the frost, and we believe it is no unusual occurrence to see these flues heated to red heat, and that for weeks together, without any material injury being done. It may be urged as an argument against the flues, that plants and fruits are not so well grown on the Continent as at home. This we grant; but at the same time we may state, that both plants and fruits are as well grown in this country by the common flue as by the best-constructed hot-water apparatus; and it is not many years since Mr. S. Barnes, one of the best forcing gardeners in England, stated that he would rather have a good flue than a badly-constructed hot-water apparatus, and we doubt not almost every intelligent gardener in the country would say the same. Mr. Crawshay—than whom no person ever produced finer Grapes—always preferred flues for heating his vineries; facetiously remarking, in relation to the waste by hot-water heating, "that he could not afford to cook a leg of mutton at the top of the chimney," meaning that the heat wasted by hot water was sufficient for that purpose. He was not far wrong; for whoever will take the trouble to examine a properly-constructed flue will find the further extremity nearly cold; but test the chimney of a hot-water apparatus, and you will in many cases find it exceedingly hot, and we believe it will be found impossible so to construct or fix a boiler as to enable it to appropriate and carry off all the heat or caloric generated by the fuel. Boilers differ in this respect; but we have never yet met with one so constructed as to be free from loss, or which could, under the best management, absorb all the heat generated for its use.

It is not our wish to underrate hot water; its safety, neatness, adaptability, and when properly constructed and managed, certainty of action will always ensure its use with those who can afford it; but it is the million for whom we write, and it is right that they should know that flues, when properly constructed, will do all that can be attained by the best constructed hot-water apparatus. Subjoined is a plan of heating flues by a very economical process, viz., the burning of limestone, so that where fuel is scarce and limestone plentiful, a twofold object may be attained, viz., forcing-houses heated, and lime for the use of the garden manufactured. For this plan we are indebted to Mr. M. Kelly, gardener to T. Conolly, Esq., M.P. of Castletown, Ireland; and when we say that, without any other means of heating, Mr. Kelly has for more than twenty years cut grapes, and good grapes, too, in April, we need say no more as to the value of the plan. The following is Mr. Kelly's description of the kiln:—

"The preceding is a section and elevation of the lime-kilns at Castletown, the seat of Thomas Conolly, Esq., M.P., for heating the hothouses. One kiln is used to each house, which is thirty feet long by eleven feet wide, and the kilns are close to the back wall, and covered over by sheds. The exterior walls of the kiln are built of stone, two feet thick, and the interior is lined with hard or fire brick; and round the mouth at the bottom there must be a fire-stove. The bottom of the kiln is ten inches square for a height of ten inches, one side being left open for drawing off the lime. There is no grating or fire bars, but about three feet from the bottom, in the front side of the wall, a round hole, about three inches in diameter, is left to admit air to assist or promote combustion. These kilns only differ from ordinary lime-kilns in being smaller; and they require about two bushels of broken stones and half a bushel of small coal, in alternate layers, each time they are dressed or charged; but the quantity varies much as the kilns work well or ill, and, of course, much of their working depends upon their being managed by a person who thoroughly understands them. The flue, which is of the usual form, must start immediately under the cover of the kiln, and must rise towards and into the house—that is, the mouth of the flue must be from six to twelve inches above the top of the kiln, and a damper must be placed near the entrance of the flue to check the draught in case of need. The kilns are drawn and dressed twice in twenty-four hours, taking care to clear the mouth of the flue each time they are dressed, or the flues are likely to get choked. In lighting a kiln a quantity of fire-wood is placed in the bottom, and nearly half-way up the kiln, and the fire is put to it at the bottom."

Flues are liable to accidents, but these more frequently arise from imperfect construction and the bad management of those who attend the fires, than from any other cause. A flue, to be effective and certain, should, at the starting point or mouth, be at least eighteen inches above the fire place, and should rise gradually from the mouth to the chimney; the turnings of the flues should be as obtuse as possible, and wherever there is a turn, it should, to ensure a good draught, rise considerably at that point. As regards size, that is immaterial; but a rather deep and narrow flue, will, other things being equal, generally have a better draught than a broad shallow one. Some of the market gardeners about London make it a rule to build new flues every fourth or fifth year, using the old bricks for other purposes, and this, where common bricks are used, is, no doubt, a good plan, more especially where hard-forcing is practised; but if flues are properly constructed, they ought to stand from ten to fifteen years, and indeed we know some that have stood longer. A few years back it was customary to use Gowen's flue-bricks, figures of which may be seen in the *Encyclopædia of Gardening*. The object of the inventor of these bricks was to insure the quick transmission of heat, forgetting that they would be cooled as quickly as heated, and, consequently, what was gained at one time would be lost at another.

Few bricklayers know how to build a flue properly; generally they use mortar in much too great a quantity, and not in a sufficiently fine state. Flue-mortar should always be well ground, should be of the best kind, and used in the least possible quantity. In building, the mason's practice of consolidating his work by striking the brick with a mallet should be observed, as it is impossible to use too little mortar, so long as there is sufficient between the bricks to hold them together. The brick-work of flues is liable to be deranged from the accumulation of explosive gases, and from external injuries; but to prevent these we have contrived a flue, represented by the annexed diagram. The bottom and cover tiles are made with grooves or chasings, into which fit corresponding projections on the side tiles, and hence the flue becomes almost a solid body, secure from everything but wilful injury externally; and from being so strong at the joints, much less liable to be deranged by internal explosions. In manufacturing these tiles, the under and cover tiles, in addition to the grooves represented, have a groove at one end and corresponding projection at the other, and the side tiles have one grooved and three projecting sides, and thus fitting all together, it is almost impossible to disturb them, and the flue is consequently not only very strong, but very safe. Flues constructed as here directed would answer every purpose for horticultural heating; and after the first construction would be found very economical, as they would consume any kind of fuel, and give off a great quantity of heat. The tiles, we expect, will shortly be manufactured by a competent person, when we shall give a further notice of them.—A.

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THE CULTIVATION OF ROSES IN POTS.—SELECTION OF KINDS.

By Mr. JOHN SAUL, Durdham Down Nursery, Bristol.

IN naming a selection of Roses adapted for pot-culture, I will commence with those suited for climbers, selecting them principally from the Hybrid Chinas, Hybrid Bourbons, and some others; and passing by the Roses classed in the catalogues as Climbers, the blooms of the majority of which being very inferior. [How many more Roses are there worth cultivating?]

ROSES SUITED FOR CLIMBERS IN POTS.

Hybrid China:—

Blairii, No. 2; pinked blush, large.
Chenedole; brilliant crimson, large, superb.
Comtesse de Lacepede; silvery blush, fine.
General Allard; bright rose, large, beautiful.
General Jacqueminot; deep lake, very fine, and large.
Gloire de Couline; very brilliant carmine, shaded with crimson, superb.
Hypocrate; bright rose, perfect, beautiful.
Jenny; rosy lilac, large, superb.
Leopold de Bauremont; rosy pink, very double, beautiful.
Magna rosea; delicate blush, large, fine.

Hybrid Bourbon:—

Charles Duval; rose, large, very beautiful.
Coupe d'Hebe; delicate flesh, extremely beautiful.
Elizabeth Plantier; dazzling crimson, large, fine.
Great Western; reddish crimson, very large.
Henrie Barbet; rosy crimson, large, fine.
Paul Perras; brilliant rose, very large, beautiful.
Paul Ricaut; scarlet crimson, large, and double.
Tippoo Saib; rosy crimson, beautiful.

Alba:—

Madame Audot; pale flesh blush, beautiful.
Madame Legras; pure white, centre pale lemon, fine.

Damask:—

La Ville de Bruxelles; bright rose, large, full, beautiful.
Madame Stolz; pale lemon, perfect, superb.
Madame Zoutman; cream, large, full, very beautiful.

Bourbon:—

Bouquet de Flore; bright carmine, very fine.
Le Grenadier; purplish crimson, beautiful.
Pierre de St. Cyr; glossy rose, large, beautiful.
Pourpre Parfait; very deep purplish crimson.

Noisette:—

Caroline Marniesse; creamy white, blooming in clusters.
Cloth of Gold; clear yellow, large, extremely fine.
Lamarque; lemon, large full centre, beautiful.
Phaloe; white shaded with lemon, fine.
Pourpre de Tyre; purplish crimson, large.
Solfaterre; bright sulphur, large, superb.
Triomphe de la Duchere; pale rose, flowering in large clusters.

The following selection are well adapted for growing as dwarfs and pyramids

Moss:—

Blush; pinkish blush, fine.
Celina; purplish crimson, beautiful.
Crested; rose, large, and fine.
Lanei; deep carmine, large, full, superb.
Princesse Royale; bright salmon, beautiful.
Prolific; large rose, fine.

French:—

Boule de Nanteuil; purplish crimson, very large, full.
D'Aguesseau; brilliant crimson, large, beautiful.
Eulalie le Brun; rosy pink, with white stripes.
Grain d'Or; brilliant crimson, fine.
Grandissima; dazzling crimson, splendid.
Kean; crimson scarlet, beautiful.
La Circassienne; rosy pink, very fine.
Œillet parfait; white, striped with rose and red, unique.
Oracle du Siecle; rich crimson, large, full, fine.

[illegible]; crimson, very large, beautiful.

[illegible] PROVENCE:—

Blanchefleur; white, delicate blush centre, fine.
Comte Plater; cream, extremely pretty.
Pauline Garcia; white, centre straw, beautiful.
Princesse Clementine; pure white, very beautiful.

HYBRID PERPETUAL:—

Amandine; blush, with pink centre, large, superb.
Baronne Prevost; bright rose colour, a magnificent rose.
Comte de Montalivet; purplish crimson, beautiful.
Comet or Perpetual Provence; bright rose, large, and fragrant.
Dr. Arnal; dark crimson, large, and fine.
Dr. Marx; rich carmine, large, superb.
Duchesse de Montpensier; glossy blush, very beautiful.
Dutchess of Sutherland; bright mottled rose, fine.
Geant des Batailles; dazzling crimson, an approach to scarlet, beautiful.
General Negrier; bright rose, of exquisite shape.
Jacques Lafitte; brilliant rose, large, and fine.
Jeanne d'Arc; delicate blush, large, and truly beautiful.
Lady Alice Peel; bright carmine, extremely lovely.
La Reine; brilliant glossy rose, very large, fine.
Madame Pepin; light rose, beautiful.
Madame Guillot; pinkish crimson, large, and beautiful.
Madame Laffay; bright crimson, superb.
Madame Trudeaux; bright crimson, large, very fine.
Marquise Boccella; blush, pink centre, fine.
Reine des Fleurs; glossy pink, perfect, very beautiful.
Robin Hood; brilliant carmine, very fine.
Sydonie; rosy pink, large, and superb.
Standard of Marengo; carmine lake, fine shape, beautiful.
William Jesse; lilac crimson, large and fine flower.

BOURBON:—

Comice de Seine et Marne; cherry crimson, pretty and beautiful.
Comte de Rambuteau; rosy crimson, neat and good.
George Cuvier; rosy crimson, very fine.
Henri Lecoq; light carmine, superb.
Le Grenadier; crimson lake, very beautiful.
Le Marechal du Palais; very delicate rose, beautiful.
Madame Nerard; silvery blush, perfect, beautiful.
Marianne; bright rose, large, superb.
Marquise de Moyria; brilliant carmine, very fine.
Menoux; very light carmine, brilliant, beautiful.
Queen; fawn shaded with salmon, beautiful.
Souchet; purplish carmine, large, superb.
Souvenir de la Malmaison; white with fawn centre, large, magnificent.
Vicomte de Cases; cherry red, very beautiful.

CHINA:—

Archduke Charles; light rose changing to brilliant crimson, distinct, superb.
Clara Sylvain; pure white, very clear, beautiful.
Cramoisie Superieure; dark crimson, superb.
Eugene Beauharnais; bright lake, beautiful.
Madame Breon; clear rose colour, superb.
Mrs. Bosanquet; creamy white, splendid.

TEA:—

Adam; rosy blush, very large and magnificent.
Abricot; bright fawn colour, very good.
Caroline; rosy pink, very pretty.
Comte de Paris; delicate blush, distinct and superb.
Devoniensis; creamy white buff centre, very beautiful.
Eliza Sauvage; cream with deep orange centre, fine.
Goubault; salmon, very sweet, beautiful.
Irma; rosy blush, large, beautiful.
Josephine Malton; white with creamy centre, superb.
Mirabile; rosy fawn, very fine.
Mondor; blush, fawn centre, beautiful.
Niphetos; creamy white, large, superb.
Nisida; rosy buff, large and beautiful.
Pellonia; cream with yellowish centre, fine.
Perfection; bright apricot colour.
Princesse Adelaide; fine yellow, very beautiful.
Safrano; deep fawn, beautiful in the bud.
Souvenir d'un Ami; delicate rose, large and splendid.
Viscomtesse de Cases; deep golden yellow, beautiful.
Yellow; sulphur, very fine.

NOISETTE:—

Aimée Vibert; pure white, very beautiful.
Clara Wendel; pale yellow, pretty.
Miss Glegg; white, with pale rose, superb.
Narcisse; pale lemon, extremely fine.
Ne Plus Ultra; cream white, dwarf habit, beautiful.
Victorieuse; delicate blush, beautiful.

In looking over the list of varieties, it will be observed that the autumn blooming varieties—as the Hybrid Perpetuals, Bourbons, Chinas, Teas, and Noisettes—principally prevail, for not only are they beautiful in the autumn but likewise in summer. Their adaptability for pot-culture is superior to the summer classes; and none excel more than the Hybrid Perpetuals, which are really invaluable for pot-culture; from them, however, I have excluded many beautiful autumn flowering varieties, which open their blooms but indifferently during summer, and which, if cultivated in pots, would not expand their flowers well in the hot weather we frequently have in May or June.

EXPERIMENTS ON THE DECOMPOSITION OF CARBONIC ACID BY PLANTS.*

By M M. Cloez and Gratiolet.

IT has been long known that the green parts of plants decompose the surrounding carbonic acid and separate it from the oxygen. The submerged aquatic plants possess this property in a very high degree, and thus disengage, in a comparatively short time, and in the normal condition of their existence, an enormous quantity of oxygen. The knowledge of this fact led us to choose these plants for the subject of some experiments which were made with various species of Potomogeton, Naias, Ceratophyllum, Myriophyllum, and Confervæ. The conclusions we have formed may be stated under the following heads:—

1. *Influence of light.*—The disengagement of oxygen, which takes place very rapidly in solar light, becomes insensible in a diffuse light, and is perfectly stayed in darkness. In the latter case, the plants of which we speak, contrary to the opinion generally received, do not evolve the smallest trace of carbonic acid. We endeavoured to determine comparatively the action of coloured glasses on the decomposition of carbonic acid by the green parts of plants; and, as far as the difficult nature of the experiments permit us to judge, we have concluded that the activity of the phenomenon is at the maximum when plain and unpolished glasses are used. The yellow glass comes next, then the plain transparent, the red, the green, and last of all, the blue. We are satisfied that these differences do not hold good with a difference of temperature.

2. *Influence of temperature.*—The decomposition of carbonic acid by aquatic plants exposed to the light in a medium, of which the temperature rises from 4° Centigrade [about 40° Fahrenheit], does not commence below 15° [59° Fahrenheit], and appears to attain its maximum at 30° [86° Fahrenheit]. The decomposition of carbonic acid by plants exposed to the light in a medium, the temperature of which is lowered from 30°, continues to act until 14° 13′ 12″, and does not completely cease till it reaches 10° [50° Fahrenheit]. This result is, indeed, conformable to the conclusions which M. Chevreul has drawn from his observations on the circulation and ascent of the sap.

3. *Influence of the composition of the surrounding medium.*—The vegetation of submerged plants continues during several months in the water of the Seine, if aërated and renewed every day. In river water deprived of air by ebullition, and containing only carbonic acid in the same proportion as the water of the Seine, and which is also renewed each day, the decomposition at first is very active, but by and by it becomes subdued, and ceases completely at the end of four or five days. After that time the intensity of the green colour of the plant is considerably diminished. The phases of this phenomenon are very remarkable. Indeed, it may at first be observed that the gas which is produced is mixed with a certain quantity of azote, which goes on diminishing to that point at which the decomposition stops, when the air that is disengaged is almost pure oxygen. It may also be observed that the total volume of azote gas which is disengaged is much more considerable than the bulk or volume of the plant; and if the plant is submitted to an elementary analysis, it is found that at an equal weight it contains much less azote than a portion of the same plant which has not been submitted to an experiment. These facts demonstrate that in the act of vegetation of submerged plants a certain quantity of azote is produced by the decomposition of the same elements of the plants; that consequently a reparation is necessary, and that the free or combined azote is an indispensable element to the life of aquatic plants. From these experiments we were constrained to investigate the influence of ammonia and ammoniacal salts, and we have found that ammonia and ammoniacal salts under water in a dose of one ten-thousandth in weight, have always been hurtful. The decomposition of carbonic acid diminishes and stops at the end of some hours. We have, consequently, a right to conclude that the plant assimilates directly the azote gas in a state of dissolution in the water.

4. *The movements of the elements which are absorbed or exhaled by the plant.*—Everybody may easily observe that whatever the position of the leaves of Potamogeton may be, some carbonate of lime is constantly deposited at the superior face of the leaves (we say superior in the sense understood by botanists), and never at the inferior face. This fact appears to demonstrate that the absorption of carbonic acid takes place essentially by the superior face of the leaves. The oxygen produced by the decomposition of carbonic acid has, in the plant, a perfectly defined course. It descends constantly from the leaves towards the root. Thus, when a branch or slip of Potamogeton, provided with a few leaves, is placed horizontally in water, the escape of the gas always takes place by the section nearest the radicular extremity of the plant.

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* From the *Comptes Rendus.*

Miscellaneous Notices.

Testimonial to Mr. Munro.—This project was started by a few friends of Mr. Munro to present him, on his retirement from the Curatorship of the Garden of the Horticultural Society of London, after a service of thirty years, with a slight token of esteem and respect, and a half-crown subscription was entered into for the purpose. This was immediately warmly responded to; not only by gardeners, but by some of the nobility and gentry of the land. On Dec. 23, the Committee and a few friends dined together at Stevens's Hotel, New Bond Street, Mr. Glendinning acting as chairman and Mr. Edmonds (of Chiswick) as vice-chairman, and on that occasion Mr. Munro was presented with a handsome Gold Watch and Chain, bearing the following inscription:—"Presented to Mr. Donald Munro, F.L.S., by 260 of his friends, as a token of respect and esteem, on the occasion of his retiring, after thirty years' servitude, from the Curatorship of the Gardens of the Horticultural Society of London. December, 1850." In presenting the watch, Mr. Glendinning pronounced a very high eulogium upon the character of Mr. Munro, not only as connected with his scientific and professional attainments, but also for his estimable qualities in private life.

It affords us much pleasure to add that the Council of the Horticultural Society have granted Mr. Munro a pension for his long servitude, which will enable him to pass the remainder of his days in ease and comfort. This is a just tribute to merit, and alike honourable to the giver as to the receiver. To other societies who have old servants, and to the employers of gardeners also, we say,—go and do likewise. A balance sheet of receipts and disbursements will, we believe, be forwarded to each subscriber.

Caledonian Horticultural Society.—Dec. 5.—The office-bearers for 1851 were elected, and various prizes awarded for fruits, flowers, and vegetables, sent in for competition. The silver medal offered by the Society for the best collection of dried specimens of British plants, including Filices, was awarded to Mr. John Anderson, journeyman, Edinburgh Botanic Garden, his collection containing 640 species correctly named, and arranged according to the natural system; a second prize, with certificate of merit, was voted to Mr. William Smith, journeyman, Experimental Garden, for a collection containing about 520 species and varieties, likewise arranged according to the natural system; Messrs. P. Lawson and Son's prize of two guineas, for the best collection of dried specimens of Hardy Perennial Herbaceous Plants, was awarded to Mr. Thomas Fairley, journeyman, Edinburgh Botanic Garden, who produced a most excellent collection, containing 1,859 species and varieties, arranged according to the natural system of Lindley, as given in the last edition of the *Vegetable Kingdom*. Among the other articles exhibited were fruit of Saracha viscosa, with a sample of jam made from it, from Stewart B. Hare, Esq., Lochrin House; a plant of Cupressus torulosa from Mr. John Wilkie, gardener, Garvald House, accompanied by a communication mentioning its hardiness at Garvald, at an elevation of 1,200 feet; a large coloured drawing of Victoria Regia, by Mr. Jaffrey, Warriston Lodge; and specimens of the Glen Dwarf Drumhead Cabbage—stated to be a valuable variety for agricultural as well as garden purposes—from Mr. Handasyde, Glen Nurseries, Musselburgh.

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Review.

Encyclopædia of Gardening, comprising the Theory and Practice of Horticulture, Floriculture, Arboriculture, and Landscape Gardening. By J. C. Loudon, F.L.S., H.S., &c. A new edition, corrected and improved by Mrs. Loudon. London: Longman and Co., 1850.

As a standard work, Loudon's "Encyclopædia" has long held a high position in Horticultural literature, and it must be confessed no other book in the English or any other language supplies such an amount of information on the subjects upon which it treats. In the present edition, some of the objectionable parts have been expunged, and, so far as relates to the history and science of gardening, it is much improved, having received assistance from the writings of Dr. Lindley, and also personal assistance in Geology from Professor Ansted; in Chemistry, from Professor Solly; and in Entomology, from J. O. Westwood, Esq. To these parts, and also to the history of Gardening, a great quantity of new matter has been added; and we wish we could say as much for the cultural part; but truth compels us to assert that that department is neither so full nor yet so modern as it ought to have been. For illustration, under the head Pine Apple the only new matter is an article from Mr. H. C. Ogle on the Hamiltonian system—but not a word is said of the large Pines grown at Gunnersbury, or those at Mr. Purdy's, Bayswater, or at Trentham, and no notice is taken of Mill's treatise, or of the Meudon system of growing that fruit. Again, under Melons, not a word is said of Duncan's, Mill's, or Moore's systems, or of the splendid Melons grown in Ireland by Mr. Walker, or those produced from Trentham. In Vines the greatest novelty is the Coiling system, now seventeen years old; and in Cucumbers the works of Smith, Allen, Weedon, Mills, Duncan, Ayres, or Moore, are unnoticed, though the last three are allowed to be the best on the subject. These are grave omissions, and such as ought not to have occurred in a new edition of a standard work. The empiricisms of such authors as Nicol, Maw, and Abercrombie, though valuable in their day, are now "gone out," and though they may serve for comparison with better systems, they should not have been retained to the exclusion of modern improvements. The lists of fruit and vegetables have been revised by Mr. Thompson of the Horticultural Gardens, and generally the selections are very judicious, and the best kinds in each list being indicated by a special mark, makes them still more valuable. The work is profusely illustrated, and beautifully got up; and, as a whole, is an authority which every gardener should fortify himself with.—A.

THE GARDENERS' AND NATURALISTS' CALENDAR FOR JANUARY.

FLOWER GARDEN.—IN-DOOR DEPARTMENT.

Conservatory.—A finer autumn and early winter than we have just experienced in the departing year, have rarely been seen in our changeable climate; and hence, where plants have been properly attended to, they ought to be in excellent condition: when we say excellent condition we do not mean they should be in free growth, but should look fresh and healthy, with the season's growth thoroughly matured. Some of the Acacias will now be advancing into bloom, and when the conservatory is kept tolerably warm, or it is planted in the most sheltered part, the Luculia gratissima will begin to unfold its delicately coloured and exquisitely scented blossoms, than which, at this festive season, nothing can be finer, or more deserving of extensive cultivation. Camellias will also be advancing into bloom, and care must be taken that they do not know the want of water, or the buds will be cast off without opening. These, with the plants from the stoves and orchid-house, the Hyacinths, Tulips, and other bulbs from the forcing-house, with a few Heaths, Epacrises, and other plants from the greenhouse, to say nothing of Cinerarias, Violets, Mignonette, &c., from the frames, will impart a gay and very interesting appearance to the conservatory at this season. To preserve the flowers, keep the atmosphere moist, but not wet; water when necessary, more especially the bulbs, and keep a temperature of from 40° to 50°, rising a few degrees by sun-heat. Ventilate daily if possible, if only for a short time; but avoid draughts, more especially if the atmosphere is at all frosty.

Orangery.—The trees will now be in a dormant state, and hence little can be added to former directions. Do not, however, neglect to prune and clean the trees thoroughly during the winter, recollecting that the more you do at this season, the less you will have to attend to when the busy season of spring comes round. The temperature must not fall below 40°, for though we read of snow-clad Orange groves, my experience of nearly thirty years, enables me to say that a very low temperature is not good for them. Where new borders have to be prepared for planting the orange, now is a good time to proceed with the work, and no tribe of plants is better suited to cover the walls of conservatories. If the stock of small Orange trees is large, some of the forwardest of them may be introduced into the forcing-house, for the sake of a little early blossom.

Forcing Flower-house.—Here business must now commence in earnest, and if not already done, a few plants of all kinds, American plants, Indian Azaleas, Bulbs, Roses, Lilacs, &c., &c., must be introduced, and started gradually, while towards the end of the month a good stock of Pinks, Sweet Williams, and Lily of the Valley, may be started gradually in any pit or other favourable situation. In the forcing-house the temperature should not fall below 50°, and as the days increase in length the temperature may increase about 4° or 5° a-week, until it attains a minimum temperature of 60° and maximum of 70° by fire-heat, allowing the temperature to increase 10° by sun-heat. Give air daily, if only for a short time; syringe the plants every fine morning, and keep the atmosphere at all times moist and genial.

W. P. AYRES.

GREENHOUSE—HARD-WOODED PLANTS.

In this month when we generally expect hard frost, it is necessary to exclude it by employing as little fire-heat as possible. A temperature of about 40 should be the mark; but in the day it does not matter if it rises a little higher, particularly where the house contains flowering plants. Be very careful not to open the fro sashes when the wind is cold and cutting, and be su to sprinkle the floor and shelves occasionally after muc fire-heat. Although for the most part the plants wi be at a stand-still; yet no time should be lost in makin preparations for the coming spring. Get plenty of pe chopped, crocks broken, pots cleaned, and have i readiness a good quantity of clean small pebbles fo mixing with the soil used in potting. Many cultivato are fond of charcoal; but it is of no use to hard-woode plants; in fact, it does more harm than good. Finis training, or tying anything that requires it; and re member that you cannot begin to train a plant too soo if you wish to make it a good specimen.—JOHN FRASE Lea-Bridge Road Nursery, Leyton, Essex.

Heathery.—But little can be added to the direction of last month; the same general principles prevail, an must be observed. If fires are obliged to be used, tak care to remove the early flowering kinds, as Physodes, Ardens, Vernix coccinea, Aristata major, Elegans Mirabilis, and the like, as far from its influence a possible, or they may be too far advanced before the shows come on. Take care that none of the plants know the want of water even at this season, but take equal care that they receive no more than is absolutely necessary. Fires in heath-houses should be avoided as much as possible, but still we are no advocates for the freezing system. A few degrees of frost may do no injury to a lot of half-starved and indurated plants, but young free-growing specimens will not be benefited thereby, more especially if they are in houses where fires are sometimes used. Though there is not much to do among the specimens, the time will soon arrive when the young plants will require potting, and hence, preparation must be made for the operation. Pots must be washed, crocks and charcoal may be broken of various sizes, mould can be prepared, and all these things will facilitate the work when longer days and the busy season arrives, and the soil will be benefited by a thorough aëration, and even a little frost will not do it any injury.

W. P. AYRES.

GREENHOUSE SOFT-WOODED PLANTS.

Pelargoniums.—Those plants which are strong and well-rooted may now be shifted, to encourage a free growth. A stronger soil may be used, taking care to drain the pots thoroughly, and that they are quite clean and dry. Stop some of the plants for a succession of flowers, and thin out all small shoots; look carefully for decaying leaves, which harbour damp, and are very injurious. One or two waterings of lime and soot-water may now be given with advantage, as it will destroy the worms that may be in the soil, and impart a fine dark green colour to the foliage. Stake those that require it, and tie out as thin as possible, to admit the air and light to the centre of the plants, which will greatly strengthen them. When the plants are dwarf, pegs may be used to bring the shoots down to the edges of the pots, for the pots to be well furnished with the foliage of a Pelargonium is a great desideratum. Stir the surface of the soil occasionally, and top-dress any that may require it. If early flowers are required, a few may now be removed to a stove or warm house, taking for the purpose Admiral Napier and Alba Multiflora, which are the very best for early forcing; Anais and Jenny Lind, in the fancy class, will also be found good for that purpose. Should there be any indication of frost, a fire should be lighted in the afternoon; in fact, it is better to shut up the houses before the sun has left them, which saves pushing the fires too hard in the early part of the evening; for the less fire that is used the better. Should the weather prove mild, a little fire is necessary occasionally to dispel the damp; of course, the sashes must be open at the same time, to allow the vapour to escape. Give all the air possible every favourable opportunity, but be careful to avoid all cold draughts, which do much mischief. Be careful in watering, for much of success depends upon this. Water none but those which are dry, and water those well. Do not allow them to stand dry too long, or the bottom leaves will become yellow. The fancy varieties will require to be kept a little closer than the foregoing, as they are rather more delicate in constitution, and as they have an abundance of leaves they will often require thinning. In potting them be sure to give plenty of drainage; silver sand should be liberally used in the compost. Fumigate occasionally to prevent the green fly making its appearance.

Calceolarias.—This is a critical season for these plants, consequently they will require a great deal of attention in watering and keeping free from insects. A little warmth is necessary for the more delicate kinds. Remove all decaying leaves as they appear; peg down the shoots to the surface of the soil, that they may root up the stems, which will give strength to the plants. Shift into larger pots such seedlings as are large enough, or prick off those that may have been sown for late flowering. A light turfy loam enriched with well decomposed manure and leaf-mould, adding a liberal quantity of silver sand, will be found indispensable for those plants. Drain freely with charcoal and potsherds.

Cinerarias.—Remove a few of the most forward to a warm house, where they will come into flower directly, and be useful for bouquets and decorative purposes. If large plants are required shift a few into larger pots, and pinch out the tops to cause them to grow bushy. Tie out or peg down to keep them open, and do not allow them to get too dry, which will cause them to go blind. Give all the air possible every favourable opportunity in fine weather. Fumigate occasionally, and dust with sulphur any that may be affected with mildew.

Fuchsias.—If large and early-flowering plants are required, a few of these should now be started in a gentle heat. Cut the old plants down, and they will be found to throw up strong shoots from the bottom. As soon as they have broken shake them out of the old soil and repot into a good rich compost. Strike a few cuttings as soon as long enough, for bedding and other purposes.

Routine.—Turn heaps of soil and manure that they may sweeten. For spring potting be careful always to have some housed for present purposes, as much injury is done by potting in wet soils. Wash pots in bad weather that they may be ready when wanted. —H. Rosier, Brookland's Nursery, Blackheath.

FLOWER-GARDEN.—OUT-DOOR DEPARTMENT.

It is said that massed flower-gardens are exponents of the minds of the gardeners of the present day; and no doubt they are. But, like all other manifestations of mind, there are evident marks of degrees of attainment, as will always be the case, where minds differently constituted are brought to bear on the same subject. Still, we think there might be a greater agreement in our flower-gardens than there really is, if the principles which have been, from time to time, alluded to in these directions, were better understood, and more strictly adhered to in practice; and if more heart was thrown into the work, it would be sure to give grace to our art, in small as well as in great things. Nothing like being true to the work we have got to do. Flower gardening, like all systems based on true principles, has the elements of advancement bound up with it; and, therefore, its course must be onward, which will be seen in new and more beautiful forms of development; and if care is exercised in drawing out plans for geometrical flower-gardens, to avoid acute-angled beds, and substitute in their stead those forms of figures, partaking more of the curved line, a sort of continuous action will be given to the eye, in following such graceful lines, and a dignity or expression, and freedom of outline, bordering on the beautiful; because simplicity and intelligibility will be seen everywhere. Plant also your flower-beds in such a way, that the figure, as a whole, may appear really larger than it is; which can readily be done, by keeping the subdued colours near the centre, and the warm colours at the outside. The effectiveness of warm colours compared with cold, under bright sunlight, should be attended to; and thus may be brought out more perfect forms of beauty in our flower-gardens. I would say to young gardeners, pursue the study of massing flower-gardens with eagerness, and be careful to select for your new arrangements, plants which are beautiful, entire, and clear in their colours; and rest assured, if you are working thus diligently, materials will be inwrought with your own being, which will so shape and fashion your thoughts, that when the day of active service arrives, you will be ready and strong in your own might; and though your outward form may change its semblance, your young ideas will ever live in remembrance.

Routine.—Look every now and then over store-pots, and boxes of flower-garden plants, and clear them of all rotting leaves; and it may be advantageous to the plants to turn them round to the light. While the principle of life is feeble in our plants, water and attend to them accordingly. Look at mother Nature how she acts, in that beautiful law of adaptation, which exists among all created things, and gather information from them. I would not be in too great haste in pruning Roses: time enough yet. If you look at your walks in rainy weather, you will see where the faults are. Leave all dug ground as rough as possible, that the air and frost may act upon it.—John Cair, Bedford Lodge, Camden Hill, Kensington.

Rose Garden.—Presuming that all requiring protection is prepared and ready should a change to frost take place, and as the weather has been so favourable for forwarding planting and other garden work, little can be done during this month except forwarding, at all opportunities, the preparation of soil, for beds, potting, and whatever it may be wanted for, and trenching and preparing ground where it could not be done earlier in the season. Keep the stock of plants in pots for forcing from heavy rains and snow, but let them have plenty of air, day and night, while the weather is open. All those that are to be forced into flower early in the spring should be pruned early in the month, and those to flower later in the spring by the end of the month. After they are pruned they must be carefully preserved from extreme frosts. Begin to place them rather freely in the forcing-house or pit, particularly towards the end of the month, and take care to set them in a part where they may have plenty of light and sun, and air when the weather is favourable. Force [illegible]ly, as fast forcing will make them weak and most likely to fail altogether; the slower the forcing is carried on, the finer the bloom will be. For further directions consult previous calendars.

If stocks for next season's working are not already planted, they should be got in with as little delay as possible.

In taking leave, after a twelvemonth's labour among Roses, I hope the observations I have made have been found useful to the readers of this interesting periodical. What I have stated has been the result of practice and close observation for a number of years, and it will give me great pleasure to afford any one the means of judging of the value of the directions I have given.—H. M'Millan, Westerham Nurseries, Kent.

Arboretum.—The state of the weather during January is generally so uncertain, as regards severe frost, that it will be better to defer planting operations to any extent for a time: much, however, may be done in the way of preparation for more settled open weather, such as draining, trenching, and bringing forward a supply of composts ready for immediate use when required. I have all along advocated both the advantage and necessity of early autumn planting, but as this cannot always be done, we must make the best of good weather in early spring: it is, therefore, doubly necessary that we should make what preparation we can this month, so that no time may be lost when the weather serves. In those parts where the planting is completed, there is much that may be done in the way of levelling and making the necessary preparations for turfing over such spaces as require it, also the removal of all unsightly refuse, the remains of former planting, or the prunings of trees. Laying down turf should be deferred until settled open weather, as there is always extra trouble, and frequently much loss of turf incurred, when this is prosecuted in frosty weather. Seasonable opportunities must be taken advantage of to cart in a good stock of soils and composts, and these will be much benefited by frequent turnings and exposing fresh surfaces to the atmospherical influences.

Shrubbery.—The foregoing remarks, as regards preparation for future planting, will apply with equal force here. Let a liberal top-dressing be applied to established shrubberies, and as dry weather occurs the necessary process of forking up must be followed up at every opportunity. In well-established thick shrubberies this process is not absolutely necessary, but in those of recent formation, where the foliage has not covered the soil, or near the borders, where more neatness is required in consequence of its being brought in more immediate contact with the eye, it is not only necessary but also advantageous for the plants themselves, because it acts as a root-pruning operation, and tends to ensure a compact habit of growth, and a greater degree of inflorescence.

The following will complete my short list of desirable shrubs for small gardens

Weigela
Euonymus japonicus.
Rhamnus latifolius.
Halesia tetraptera.
Rhus cotinus.
Philadelphus Gordonianus
—— floribundus.
—— elegans.
Arbutus ovata.
Pernettya angustifolia.
—— mucronata.
Cotoneaster microphylla.
—— rotundifolia.
Calycanthus præcox.
Hydrangea quercifolia.
Viburnum japonica.
Ilex latifolia.
—— ciliata.
Gaultheria Shallon.
Leycesteria formosa.
Cistus ladaniferus.
—— roseus.
—— purpureus.
—— formosus.
—— corbariensis.
—— marginatus.
—— candidissimus.
Escallonia rubra.
Illicium floridanum.
Duvaua latifolia.
Benthamia fragifera.
Arbutus Unedo.
—— Andrachne.
Deutzia corymbosa.
Phillyrea angustifolia.
edia.
oleæfolia.
Fabiana imbricata.

The above are all very suitable for planting in conspicuous situations along the borders; the background may be filled with commoner sorts, as common and Portugal laurels. Some of the beautiful pink and crimson thorns should be intermixed amongst them. Lists of this kind might be greatly extended, but I have only aimed at noticing a few, which being both desirable and easily procured, may be safely selected by small proprietors who only require a few good and interesting things.

JOHN COX, Redleaf.

FRUIT-GARDEN.—IN-DOOR DEPARTMENT.

Pinery.—When fruiting pines are swelling, their fruit maintain a tolerably moist atmosphere; but act cautiously with any that are in bloom, as moisture upon the organs of fructification will at this season be found exceedingly inimical. Some of the more forward of the spring fruiters will now be showing fruit; and therefore, towards the end of the month, the bottom heat must be slightly increased, and a little extra moisture given to the roots, to make the plants throw up strong and healthy. If the bottom heat is supplied by tan, fresh material must be placed between the pots, taking care to stir the old tan deeply with a fork or pointed stick before the new is placed upon it. Increase the heat a few degrees towards the end of the month. Where fruiting pines are planted out, the bottom heat must be slightly increased as before directed, either by increased supplies of dung to the linings, or by tanks.

Succession Pit.—These will still be comparatively in a dormant state, but if the weather is favourable at the end of the month the strong plants intended for autumn fruiting, may, if the pots are full of roots, receive a shift, and be placed in a pit by themselves, so as to induce an early and vigorous growth, for upon this much of the success of producing fine fruit in the autumn depends; the bottom heat, however, until the plants get into growth, should not exceed 75° at the bottom of the pot, and a night temperature of 50° will be ample for the present, allowing the pit to rise a few degrees in the day time, or by sun heat. The young stock will require a little water occasionally, especially in pits heated by fire heat. Prepare soils, tan, &c., for a general shifting next month.

Vinery.—The Vines in the early house will now be in bloom, and therefore the utmost caution must be observed to maintain a steady temperature and genial atmosphere. Do not on any account permit the heat to fall below 60° during the night, but, on clear bright days, 70° should be the minimum of fire heat, taking care to introduce a stream of warmed air as long as possible. Look to the external borders, see that there is no declension of heat, and add, if requisite, fresh heating materials. Late houses must be managed according to previous directions, and a third or fourth house, if necessary for the supply, must be started, observing to commence with a low temperature and to increase gradually, as great haste is generally bad speed, more especially in early forcing.

Vines in Pots.—Where the fruit is set, thin, and, as soon as it is large enough, push the plants along, for, as the roots here are under proper control, no fear need be entertained of the plants sustaining injury, that is, if properly treated. Introduce a few fresh plants the beginning and end of the month, observing the rules previously laid down as to temperature, &c. The plants swelling fruit may be assisted occasionally in bright weather with a little weak manure water.

Routine.—Prepare dung, leaves, tan, &c., to form hotbeds to start small succession Pines—also for striking Vines and other purposes. Get soils, pots, crocks, &c., in readiness for a general potting next month.

JOHN SPENCER, Bowood Park.

Figs.—The early house may now be set to work. Where there are plants in pots and tubs, it is preferable to start those first. They should all have a good watering. Syringe two or three times a day, and maintain a moist atmosphere. Begin with a night temperature of 45°, and a day one of 55°; and in the course of a fortnight or three weeks, increase the temperature gradually so as to give an advance of 8° or 10°. On fine days give a little air: they will not require much at the present stage.

Peaches.—The artificial heat in the early house may be increased 5° or 6° in the day, but not quite so much at night. A steady temperature of 50° should be aimed at during the time the peaches are in flower; it should neither rise nor fall many degrees beyond this. By keeping up a night temperature of this kind while the trees are in flower, and by taking every advantage of fine days to give plenty of air, we have never failed to get five times as many fruit to set as we leave to ripen. As soon as the buds begin to swell, syringing should be discontinued until the fruit are all set, when it must be resumed. The moisture of the atmosphere should be still continued until the flowers begin to expand, when it should cease until the trees are out of flower and the fruit is set. Knowing, as we well do, the evil effects arising from overheating—that is, by artificial means, even at the risk of being thought tedious, we again beg to impress on the minds of our readers, the necessity of being careful in attending to the state of temperature during the period the peach is in flower. Ventilate at all times as freely as the state of the weather will permit. If the second house be started six weeks after the first, and the same treatment be given to both, the fruit in the former will be ripe about a month later than that in the latter. If the late houses are not dressed and tied, no time should be now lost in doing so; the frost should also be kept out of them by lighting gentle fires in severe weather.

Strawberries.—The first batch of these plants must have every attention paid to them at this season,—for though no plant is more easily managed late in the season, still, at this season of the year, they require a little management to get good crops. If the weather be severe when they are in flower, so that they can have but little air and a good deal of fire, under these circumstances the strawberry flower will "go blind." In order to prevent this as much as possible, keep them near the glass, give plenty of air, and a rather low night temperature, and water with tepid water. A second batch of plants should be introduced about three weeks after the first, and a batch every fortnight after during the season, so as to keep up a regular succession.—M. Saul, Gardener to Lord Stourton, Allerton Park.

Cucumber House.—The directions given last month will still require to be attended to. The weather is less favourable now, and it will require great energy on the part of the gardener for the next six weeks to keep the plants in a growing state. Remove all male blossoms as they appear, and mind that the foliage be not shaded by overcrowding, as, in that case, they soon become yellow and unhealthy; remove every unsightly leaf. See that the glass is particularly clean, as light is the only agent beyond the control of the gardener: heat, air, and moisture, he can supply as the wants of the plants need them, but light, the most important of all, he cannot control, although he can greatly assist by due attention; first, by using sheet glass, and, secondly, by due attention to washing the glass on every occasion when there is the least appearance of dirt upon it. Keep a moderately low night temperature, and a humid atmosphere by day.

Dung-bed.—This will still be an anxious department for the gardener for the next three months. The plants that have been potted off, and are showing two rough leaves, must have the centre bud pinched out, if they are intended for the dung-beds; but if they are intended for trellis-work, they must not be stopped, as they are likely to make more root by being left entire than by stopping. Where seed is still to be sown, it will be of service to place each seed on a small lump of peat about as large as a walnut, and so placed at regular distances in a shallow pot or pan, and covered about half an inch with light peaty soil, they will soon begin to vegetate. Keep them on a bottom heat of not less than 75° and near to the glass. If there is any danger of mice taking the seed, it will be well to place a piece of clean glass over the pot, and remove it as soon as the plants appear above the surface. Let the surface of the seed bed be stirred frequently, and the linings made up with sweet fermented dung. Give abundance of air on all favourable occasions.

Routine.—Collect all materials available for forming succession beds, such as leaves and long dung. Keep the dung well worked, and there will be little fear of wood-lice to annoy you later in the season.

Melons.—A sowing of some approved early kind should now be made. The same treatment as for cucumbers will be applicable.—Wm. Taylor, Gardener to J. Coster, Esq., Streatham.

FRUIT GARDEN.—OUT-DOOR DEPARTMENT.

As there is nothing of importance to be added to what I have already called attention to in the two previous Calendars, I shall take the opportunity of saying a few words on training fruit trees.

The different modes of training have been much discussed, and I believe undue importance has been attached to it by some writers on the subject. It must be confessed that a handsomely-trained tree has a very beautiful appearance; but this is not the sole end for which it is planted. Numerous fanciful modes of training have from time to time been recommended; but to secure permanently-healthy trees, they should be made to assume their natural position as nearly as possible. First, then, as to *Peach* and *Nectarine* trees: for these the fan system is undoubtedly the best, because that is the most natural form that trees so artificially placed can be made to assume. In common fan-training, much must be left to the judgment of the cultivator; but there is a mode of fan-training called Seymour's, which is truly systematic. The place of each branch and shoot is so clearly defined, that any one may, in a short time, understand the system. Why, then, is it not adopted more generally? may be asked. I can only account for it in this way, that it will not succeed in all soils and situations; and I have the more confidence in stating this from knowing that one of the sons of the originator of the system could not bring the trees under his care to assume that uniformity of appearance which the trees under his father's care had. Much injury is done to trained fruit-trees, merely to give them an artistical appearance. The branches are strained, and the sap vessels are torn and lacerated at a season of the year when nature is the least able to repair the damage. In some situations this may be of little importance, but in others it is the first precursor of gum and canker.

The *Apricot*, *Cherry*, and *Plum* are usually trained fan fashion, but sometimes horizontally. Where the walls are low, the latter is the best mode; but a blending of the two systems is a favourite plan with me, which I will explain when I am speaking of the Pear.

Pear and *Apple* trees are very generally trained horizontally; and this is, in my opinion, the best system. There is an objection sometimes started, and not without a reason either. It is that for high walls, the trees, if trained horizontally from a single stem, are so long in reaching the top of it. This may be obviated by first training it fan-shaped, and afterwards horizontally, according to the following plan:—Drive a nail at the top of the wall perpendicular to the stem of the tree; at the bottom of the wall, and at four feet distant from the stem of the tree, on each side of it, drive in other nails; from the top nail to each of the lower ones make on the wall a straight line; on this oblique line bend all the branches from the fan system to the horizontal, so that they are about a foot apart. By this plan the trees will cover the wall in a much shorter space of time than they would by training the branches horizontally from one stem.

The present mode of training *Gooseberry* bushes is susceptible of great improvement. At present, in nine cases out of ten, the branches are so near the ground, that after a heavy shower of rain the fruit is covered with dirt; and again, when the fruit is ripe it is in the best possible position for the birds to devour. I see no object in keeping the branches so near to the ground, and for the future intend to train two or three of them to three feet high before I allow them to form a head. —H. C. Ogle, Eridge Castle, Kent.

KITCHEN GARDEN.

The late heavy rains have rendered the soil too wet for carrying on cropping operations of any kind; for the less done under such circumstances the better. As soon, however, as it becomes sufficiently dry, sow Peas and Beans, of the earliest varieties, on some well sheltered border; and some of each should at once be sown in pots or shallow boxes, and placed in any situation where artificial protection can be afforded without heat. Towards the end of the month, sow Radishes and early Horn-carrots, in frames on a gentle hot-bed, and a few Cauliflower-seeds sown early in boxes will be of great use. Mustard and cress, as usual, once a-week; prepare Ash-leaved potatoes for planting in boxes or pots; cover fresh patches of Sea-kale and Rhubarb, or remove a portion of the latter to the mushroom-house, which is decidedly the best practice. Examine cauliflower plants under glass, and in frames; remove all decaying leaves, and give them an occasional dusting with lime and soot, to prevent the ravages of slugs. Additional coverings in severe frost will be necessary. Repair box-edgings, clean and roll walks, and proceed with alterations whenever the weather will permit. In frosty weather wheel out as much manure as will be necessary for the undressed quarters; as this is an essential operation, that can be done with much less trouble than at any other period. For mushrooms, &c., see former directions.—J. Charles, Gardener to Colonel Buckley, Newhall, Salisbury.

WILD FLOWERS FOR JANUARY.

Wild flowers it would indeed be vain to seek at this season of the year; only some few seedlings of our gardens are enabled so far to withstand the icy breath of winter as to put forth flowers at this season, and unless this be mild indeed, it is to the conservatory we must go for a bouquet. Yet there are certain plants which are peculiarly the plants of Christmas, replacing the long-withered flowers with berries, the sight or very name of which is indissolubly connected with this season, even by those who scarcely cast a glance upon the more delicate wildlings of the "summer wood."

> "When the year its course hath rolled,
> And brought bright Christmas back again,
> Forth to the woods with merrie hearts we go,
> To gather in the Miseltoe."

What may be the origin of the pleasant custom now connected with this plant we cannot say; but it is well known the Miseltoe was a sacred plant with our Druidical forefathers, who went forth to cut with a golden sickle the Miseltoe which grew upon the Oak. It is rather remarkable that the plant (which is a true parasite, becoming naturally grafted to the branch on which it grows), is less frequently found in the Oak than on the Apple, Hawthorn, and other trees. It has been supposed by some that the Druidic Miseltoe might have been the Loranthus europæus, an allied plant not now found in Britain, which is especially confined to the Oak in the south of Europe; these receive more probability, however, in the notion that this very rarity of the Oak-Misletoe may have caused it to be especially prized by the Druids.

It is said that the custom of decorating our houses and churches with the Holly at Christmas has also descended to us from the Druids, and that their idea in thus decorating their dwellings with these green-shining leaves and gay-scarlet berries, was to afford the sylvan spirits a congenial protection from the frosts and cold winds.—A. Henfrey.

ANIMAL KINGDOM.

Ornithology.—When all nature is wrapped in darkness and the wintry blast howls round our dwellings making the cheerful fire doubly welcome, a thought must often arise in the minds of those who, like ourselves, are devout admirers of those fairy things called birds,—where do they pass the night at this inclement season of the year? As this is a part of their history to which I have devoted some little attention, I will endeavour to explain the result of my researches.

Beginning, then, with an old favourite, the Sparrow (*Passer domesticus*), no bird has so great a variety of roosting-places; holes in trees, in walls, in stacks of wheat and hay, in the thatch of out-houses, in chimney pots, in spouts, in evergreens, in ivy by the side of dwellings, and in pigeon-houses—in all of which he will take his repose. He is a fellow that appears well with the world and himself; and, although at times a little mischievous, ought to be respected for his close attachment to man. No persecution can drive him from our dwellings; you hear his chirp when the slates are almost cracking under the heat of a July sun, and there you will find him when those slates are thickly covered with snow,—then let him dwell in peace. The Robins (*Erythaca rubecula*) generally choose evergreens as roosting-places; they will also enter out-houses, and I have found some few in holes in the thatch. Those little hardy birds, the Wrens (*Troglodytes europeus*), although rather pugnacious at some parts of the year, appear on very friendly terms now, often sleeping two and three in a bed. I have frequently taken three from the same hole in the thatch of an outhouse, which, with holes in stacks, appear to be the principal places in which they pass the night. The Great Tit (*Parus major*), Blue Tit (*Parus cæruleus*), Cole Tit (*Parus ater*), and Marsh Tit (*Parus palustris*), are very similar in their mode of roosting; holes in trees, in stacks, and in the thatch of out-houses, are the places mostly selected. I have caught the Cole Tit also, when bat-fowling, from amongst evergreens. The Long-tailed Tits (*Parus caudatus*) roost in company; it is said that they generally select the branch of a tree, upon which they sit closely huddled together. I have never discovered them in that situation: the only places that I have found them in being whin coverts and amongst evergreens. Evergreens are also the roosting-places of the Greenfinch (*Coccothraustes chloris*) and Linnet (*Linaria cannabina*): the Chaffinch (*Fringilla cœlebs*) I have so seldom met with in my bat-fowling excursions that I cannot with certainty speak to its favourite spots for roosting; but I think they will be found amongst the taller description of evergreens. The Mountain finch (*Fringilla montifringilla*), is said to roost upon the ground, but that I cannot affirm, never having met with it at any time during my night rambles. The Blackbird (*Merula vulgaris*), Thrush (*Merula musica*), and Redwing (*Merula iliaca*), are much alike in their habits of roosting, thick evergreens being the places they almost invariably choose; but the Fieldfare (*Merula pilaris*) differs widely from them, passing the night upon the ground amongst coarse withered herbage, a situation in which one not acquainted with their habits would hardly think of looking for them. The Starlings (*Sturnus vulgaris*) choose large reed beds in which to dose away the dreary winter nights. It is a very interesting sight to watch one of these roosting-places just before sunset, to see them arriving from all quarters in detached parties, when they perform some beautiful evolutions upon the wing—now towering almost out of sight, then rushing down with the swiftness of a whirlwind and stopping suddenly when within a few yards of the reeds, they commence a flapping of their wings as if with the intention of alighting, but, from some cause of alarm or from mere wantonness, they will again go through nearly the same freaks; and it is generally quite dark before the last flock has settled down. During the whole of this time they keep up a most incessant chattering: an old pollard is at times selected as a roosting-place, but it is invariably in the vicinity of water.

The Rooks (*Corvus frugilegus*) and Wood-pigeons (*Columba palumbus*) choose situations much alike—the bare branches of trees being the spots they select, with this difference: the Wood-pigeons are always found higher and close to the stem of the tree, the Rooks selecting some of the lower branches and perching nearer the extremities. The Skylark, as long as the ground is uncovered with snow, prefers meadow land to any other situation; but when the snow lies thick upon the ground, they appear to have no choice, passing the night in any situation that is a little sheltered, where they may be seen on a moonlight night closely seated together. H. WHITELY, Woolwich, Kent.

ENTOMOLOGY.—In our last month's notice upon insects (*ante.* p. 248), we more particularly noticed the *hybernation of insects, either in the egg or pupa state*, and these from the quiescent condition of the animal during their continuance, naturally appear to be those states the most likely to be undergone during a period when the amount of temperature is so low as to prevent active life, and when in fact the food of vast numbers of these diminutive creatures is not in existence. Nature, however, has determined some variations from this apparently most natural state of existence, and we accordingly find that there are some kinds of insects which pass the winter in the larvæ state, whilst others occur as perfect insects, but for the most part are in a state of inactivity.

The insects which pass the winter in the larvæ state are those which at that period of their lives reside in structures more or less remote from the open atmosphere. Many of these exist as larvæ for a longer period than a year, as, for instance, that of the Common Cock-Chaffer, Goat Moth, &c. These either burrow to great depths under ground, or are protected from the cold by residing within the stumps of trees, rotten wood, &c. Other caterpillars, which are hatched late in the autumn, likewise pass the winter in that state, secreting themselves in some sheltered hole or cavity, or preparing artificial habitations for themselves. Thus the caterpillar of the Goat Moth forms a covering of pieces of wood, fastened together, and lined with silk, whilst the caterpillar of the Tortrix angustiorana finds its way to the shelter afforded by the eye of pears, where it feeds on the rind till spring enables it to resume its more ordinary feast of leaves. Many aquatic insects also pass the winter in the larvæ state, burrowing into the sand at the bottom of ponds, &c., whilst a few terrestrial species form little societies, such as the caterpillars of the Black Veined White Butterfly, secreting themselves in a silken case under a common covering formed of leaves. I have already alluded to those larvæ which are hatched very late in the autumn from eggs covered over with a coat of gluten, which they do not quit until This is the case with the caterpillars of the Ermine Moth.

But a considerable number of insects actually hybernate in the perfect state. Such is the case with the Common Wasp, Humble Bee, Tortoise Shell, Peacock, and Brimstone Butterflies, &c. In those cases it is the female insect which survives the winter, in order to be ready to deposit her eggs in the spring, when there is a fresh supply of food. It would be curious to inquire how far, or whether, this takes place with species which feed in the larvæ state on the leaves of trees, save in the instance of the Butterflies above mentioned. The Caterpillars feed on nettles, which die down to the ground, so that if a female Tortoise-shell Butterfly were not guided by this instinct, she might deposit her eggs, in the autumn, on plants, which in the following spring would no longer exist, and consequently the brood would perish before they would find a fresh supply of nettles.

Schmid, to whom we are indebted for some valuable observations on this subject, says, that he never found or heard of any entomologist finding a hybernating individual of the Common Cockchaffer, or of the Stag Beetle, and suggests that it is only those insects which exist but a short period as larvæ, as most of the tribes of Weevils, Lady-Birds, &c., that survive the winter in the perfect state, whilst those which live more than one year in the larvæ state, as the species just mentioned, are deprived of this privilege. The arrival of cold, so soon as the hybernating insects have ensconced themselves in their winter abode, produces effects upon them similar to those which take place in the Dormouse and other hybernating animals. Their animal functions cease; and, according to Spallanzani, they no longer breathe, and have, in fact, all the external symptoms of death; and, however mild the atmosphere may be in winter, the great bulk of hybernating insects, as though conscious that no food could then be procured, never quit their quarters, but quietly wait for a renewal of their insensibility by a fresh accession of cold. Water insects, indeed, seem to be less subject to its influences than terrestrial ones, as I have often observed the Water Beetles swinging about with as much agility as in summer in water, upon the icy covering of which I have at the time been skating.

One of the situations selected by many of the smaller species of Beetles is the thick moss at the roots, and on the trunks of trees, foot of walls, banks on dry, sandy, and marshy places, margins of ponds, &c.; and the entomologist will find his labours amply repaid if he will take the trouble of collecting this kind of moss in bags during frosty weather, and bringing it home. A little placed on a deep dish or sunk plate in a warm room, will in a few minutes be alive with small Coleoptera, &c. These should be collected in quills, and may be killed by immersing the quills in scalding water for a few seconds. I have known entomologists who have regularly received bags full of this kind of moss from the New Forest, &c., during the winter season. It must, of course, be as little shaken as possible, kept from a warm room, and laid securely in bags. Many insects may also now be found by stripping off the bark from decayed trees with the dagger or bark knife, and also by digging into the rotten wood in which various kinds of grubs or maggots will be found. These must be taken carefully out, and placed with a quantity of the decayed wood into a jar, to watch their transformation. Stems of pithy plants, such as the Currant, Burdock, Bramble, Teazle-heads, and various other similar plants, must also be examined. Bramble twigs, which exhibit a small orifice at the end, are sure to afford the collector various interesting kinds of Hymenoptera, including several kinds of Bees, whose economy is in the highest degree curious. The collector must also dig round the roots of trees for Chrysalids and Beetles.

The preceding observations are, as will at once be perceived, applicable only to insects living in a natural condition in the open air; of course, insects in hot-houses and stoves are much less influenced by the winter season, and it is most probable that the Thrips, Mealy Bug, and Aphides continue to multiply throughout the year in such situations; although, perhaps, to a much smaller extent in the middle of winter than in summer. Some observations have been made upon this head, but it requires a much more extended series before any definite result can be obtained. This is, however, the more necessary, because those are precisely the insects which are the more annoying in their attacks, from the extra care and attention bestowed upon the plants to which they were attached.—J. O. WESTWOOD.

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ERRATA AND ADDENDA.

P. 85, add as a synonym to Rogiera amœna—Rondeletia thyrsoidea, *of gardens.*

P. 112, *for* Tigridia "canadensis," *read* "canariensis;" *for* "Olga," *read* "Olwen."

P. 144, under Abietinæ, *for* "Araucurieæ," *read* "Araucarieæ;" under Podocarpeæ, *for* "*Lol,*" *read* "*Sol.*"—(Solander.)

P. 203, add as a synonym to Bolbophyllum Lobbii—Sarcopodium Lobbii, *Lindley.*

P. 219, par *d*, *for* "humid," *read* "humic."

P. 226, in subtitle, *for* "Epidermus," *read* "Epidermis."

P. 283, reverse the diagram of Chrysanthemum.